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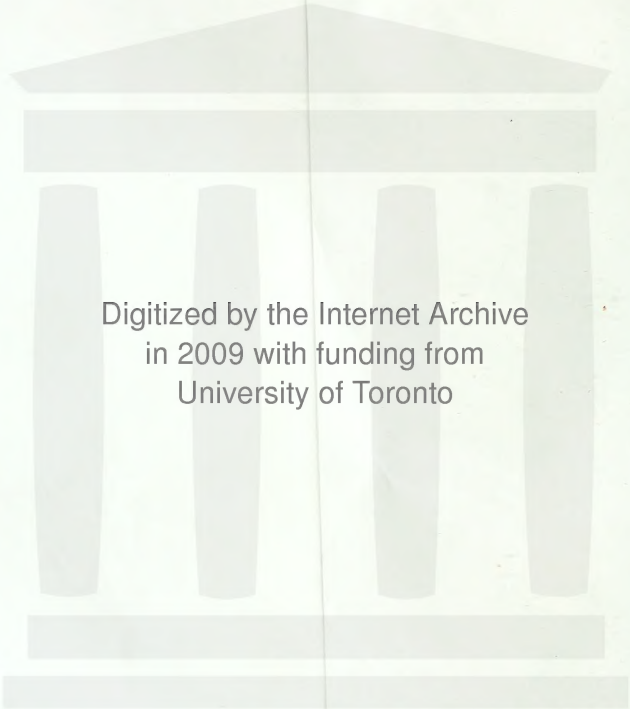
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STORAGE

Biological
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Serials

PUBLIC WELFARE

THINGS WORTH WHILE

Kitchener's watchword was "THOROUGH." Patient, silent and inevitable, he held back month after month, said little, but spared no effort to make victory, in his own chosen time, victory indeed. His method was to work, to bide his time, be silent, be thorough, and so be invincible.

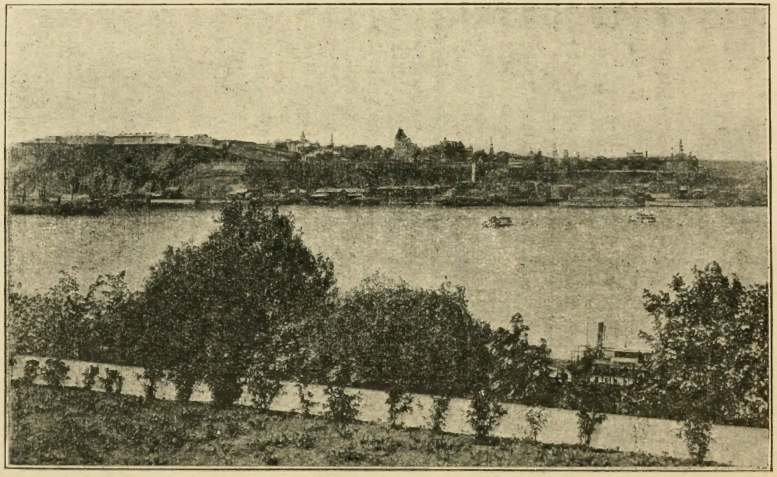
How unusual! The ordinary man seeks the good opinions of those who hold his interests at their disposal. He anchors his hopes in the constituency that elects him. He cares for the votes but not much for the issue for which his party is supposed to stand.

We should learn from this war to lead the soldier life. Self-regard seizes the shadow and misses the substance, values the personal and ignores the universal, develops the exploiter, not the great comrade. All the doors to vision are closed, all the windows of wonder, of Art and of Dream, are locked, all greatness barred or cancelled by our consideration for things not worth while.

No man's respect is worth as much to us as our own. A wholesome self-approval is our supreme possession. Only as we pull ourselves together and cleave our way to our proper goal are we worthy of any respect whatever. Let us ask ourselves every morning: What is my chief aim and how am I attempting to achieve it? When I have won out along my present lines, shall I be lord of my life or only a part of its debris? Shall I have helped or impeded others in the roads of life? Will my business and its methods carry on into the new fields of life into which death shall matriculate me or shall I be merely a by-product of my own fool-processes.

Our main tragedy consists in that we trust appearances rather than realities, thus missing the great essential meanings of life. Hail to the man of vision, to him who sees men as heroes, who lets the other man profit by the deal, who sees a brother or a sister in every human transaction.

Business is not only business; business is life. Art is not merely for Art's sake, it is for life's sake, for Love's sake. All things are for nobility and beauty and wholesomeness. Let us build the towers of life on firm foundations. Let us clothe ourselves with the heavens and dwell in the mansions of the real, for these shall abide forever.—Albert D. Watson.



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TUBERCULOSIS IN RELATION TO FEEBLE-MINDEDNESS

By PETER H. BRYCE

I AM QUITE AWARE that my personal opportunities for collecting information are not such as to entitle me to express any dogmatic conclusions on the subject I have chosen to talk about for a few moments, and yet it is perhaps true that owing to my position as Chief Medical Inspector of Immigration in Canada I have had some phases of so many mental and physical conditions brought to my attention that I catch the reflection from objects better suited to the eye at long range than if they are brought too near and the angle of incidence is too acute for proper vision.

In his chapter on "The Casual Factore of Amentia," Dr. Tredgold, Medical Expert to the Royal Commission on the Feeble-minded, says: "I believe that ancestral tuberculosis is but rarely the direct and sole cause of amentia; but my observations show that like alcoholism, it has an important indirect and possibly also a contributory influence." He further states: "With regard to persons suffering from amentia I found a pronounced tendency to tubercular lesions in the families of 34 per cent. of cases investigated. He further states: "There can be no doubt but that the death rate from tuberculosis is very much higher (nearly four times as much) in the case of aments than it is in the non-defective population." Now, at a first glance, these statements would seem to prove beyond dispute that tuberculosis plays a very important contributory if not a directly inciting cause in feeble-mindedness. Yet Tredgold himself states: "It is to be noted, however, that a history of antecedent tuberculosis rarely occurs alone; in four-fifths of my own cases it was accompanied by a definite neuropathic inheritance while in the remaining fifth other conditions, usually alcoholism, were also present." It is apparent that statistics on the subject are very inconclusive, since several possible factors seem so commonly present. Recent more exact study inclines to the conclusion that in most Anglo-Saxon communities, whether in Europe or America, the feebleminded of all degrees probably are not less than 5 per cent. in most communities; yet if the death-rate from tuberculosis be put at 0.15 per cent. and the sick from the disease at ten times as many or 1.5 per cent. in all, we find that there seems statistically no relationship between the two; yet it must have frequently been forced upon the attention of those who have had much to do with the tuberculized that one of the most obvious conditions present is what for lack of a better term we may call a nerve instability. I remember that a good many years ago a Dr. May of Philadelphia wrote many articles to prove that tuberculosis was in every sense a disease of the nervous system, and doubtless we have many clinical conditions during the disease in which nervous symptoms play a most important part. Dealing then with the broad aspects of the probable relationship between feeblemindedness and tuberculosis, we have to go back to that subject which has been for years and is likely to be for years to come the occasion of much discussion and investigation, viz., the immutability of germ plasm. Without entering into the discussion, I

wish again to quote what Dr. Tredgold says after a quite full discussion of the subject: "I hold that primary amentia is a manifestation of apathological germinal variation which has been produced by the environment, and that the germinal change is of the nature of a vitiation, that is to say, it consists of an impairment of the intrinsic potentiality for development, which may be widespread and affect the germ as a whole or which may be less extensive and confined to the neuronic determinant. At the beginning in most instances the latter is probably the case and the central change is but slight. It shows itself merely in a diminished function stability and durability of the higher and therefore an increased excitability of the lower cerebral neurones and is revealed clinically as neurasthenia, hysteria, migraine and the milder forms of epilepsy. We may say in fact that these states are the first indications of the presence of the psychopathic diathesis. Should an adverse environment continue, or should a person so affected mate with one similarly tainted, then in the next generation the neuronic durability will be further diminished and the instability accentuated so that insanity, the graver forms of epilepsy and early dementia make their appearance. If the process is further continued the third generation will often be characterized by a tendency to defects of anatomical structure and there will be a strong probability of one or more of the offspring suffering from amentia. Should this germinal impairment be accompanied by any untoward circumstances during the growth of the embryo this probability will become a tolerable certainty. Degeneracy is here well established and the well-known stigmata, indicative of an extensive germinal change are usually abundant. Finally a condition of gross idiocy appears with complete sterility and the family becomes extinct."

The breadth of Tredgold's observation and the obviously sane and practical conclusions drawn make them a convenient basis upon which anything I may say will be based. We all know of mountain valleys in Europe or old-time settlements in America where through intermarriage have been transmitted at times a general cretinism or a general feeblemindedness so marked as to give their people special historic characteristics. The story of the Martin Kallikak family so well worked out by Goddard well illustrates the fact, and others of us doubtless know family hereditary strains quite as marked although not so well worked out statistically. It is a priori quite remarkable that in every work dealing with what we may especially term social diseases as distinct from the acute infections, viz., tuberculosis, alcoholism, syphilis and feeblemindedness, we find them so intermingled often that it seems quite impossible to determine which disease is the determinant or dominant one. For instance, I can recall a family history, many of whose members have been known to me and about whom speaking thirty years ago with my father we together in a few minutes counted eighty persons who had showed insanity of a katatonic type with mild delusions and periodic acute manifestations. The lists extended back through five generations known either to my father or myself. They were a family many of whom were noted for their beauty, having delicate complexions with golden hair, but in whom the neurotic manifestations were marked especially by mental instability and in a number of cases were associated with consumption. Speaking generally the mentality of the various branches of the family was more than usually good and in two distinct branches descended from brothers intermarriage in the second generation with strong stocks of different races in two instances has produced most favorable results in the fourth generation in the offspring of two second cousins of the fourth generation who intermarried. In all except the last offspring the four generations were country or village bred. We may hence fairly assume that the new blood and good rural surroundings have been building directly toward a neuronic stability, while had the high tension of urban life and rush been allowed to exert its ordinary influence the departure from the normal would continue. It is interesting to compare this family with the Kallikak family whose history is given with so much accuracy in Goddard's book. In this group the cases starting from a low type under adverse physical environment

continue on the same or even a descending plane; but in all cases we revert to the same old question what is the real underlying cause or causes of the phenomena in any given group of cases. Goddard states that of 1,200 cases of feeblemindedness in the Royal Albert Asylum phthisis is mentioned in 291 families or 24 per cent. of the whole; but no evidence is given that the phthisis present in the children in these families was the cause of feeblemindedness. No close analysis evidently was made through an attempt to go farther in these cases. In 327 cases whose family histories have been studied by Goddard we get a very interesting analysis made:

1. Certain heredity—164 or 54 per cent.; many relatives feebleminded.
2. Probable heredity—34 or 11.3 per cent.; some relatives.
3. Neuropathic ancestry—37 or 12 per cent.; family histories showed various brain affections from apoplexy to blindness.
4. Accidental cases—57 or 19 per cent.
5. Unaccounted—8 or 2 per cent.

Speaking of tuberculosis as a causative factor in 324 cases Goddard points out that cases of tuberculosis are scattered through families in all the four groups and their incidence is such as would be accounted for by contagion. Some of these families show many cases of tuberculosis "due to the low social order of these people," but a recent Social Survey on Tuberculosis in Cincinnati says regarding low wages and tenements: "Such a low subsistence level works like black magic in the spread of tuberculosis." After this statement follows a remarkable statistic by Dr. Goddard which gives only 2.8 per cent. of all the 324 cases studied as being marked tuberculosis on the chart, while he states the percentage of tuberculized in the general population is from 10 per cent. to 15 per cent. He then draws a somewhat remarkable deduction when he says: "This agrees with the view that feebleminded stock may be primitive and possessed of much animal strength and possibly some immunity from disease." The inference is based upon altogether too limited and imperfect data to be of real value, since we find in actual statistics for over 2,000 school children that in the children of slum areas, largely British immigrants, the feebleminded are over 5 per cent. of the whole, while the prevalence of tuberculosis has long been known to be directly the measure of bad housing. As I have written elsewhere and as all other sanitary and social workers have observed: "Tuberculosis is a disease of house life, not the disease of the pioneer shack town; it is the pest of the densely populated city with its slums, overcrowded work rooms and factories. Remembering that the statistics do not note more than the most clearly defined cases of tuberculosis of the lungs, as Dr. Goddard states, and as we further note the great proportion of the feebleminded cases examined will have been children among whom consumption is rare as compared with other forms of tuberculosis, I think it may be taken for granted that we can draw but few definite conclusions from these data. The study of Goddard's cases shows much the same with regard to alcohol and leads him to the general conclusion that "Everything seems to indicate that alcoholism itself is only a symptom, that for the most part occures in families where there is some form of neurotic taint especially feeblemindedness." If the result of the careful examination of the antecedents of the feeblemindedness cannot associate them either with tuberculosis or with alcohol as the exciting cause and leads us to infer that the feeblemindedness are for the most part descended from the feebleminded, we seem to be forced back upon the conundrum posed by Dr. Tredgold when, speaking of Weismann's, Davenport's, and the others' theory of immutability of germ plasm which must be assumed to belong to members of the Simian family, he says: "One cannot help wondering how their descendants evolved into human beings at all," and then goes on to say: "I very much doubt whether the phylogency of civilized man was ever represented by a phase of evolution comparable with that of mental defect." . . . "In short, I regard the germinal variation present in these persons as a pathological one; as being of the nature of a vitiation, which instead of being of spontaneous origin is really due to negation or diminution of spontaneity. How then

is this impairment brought about? I consider it is primarily due to the action of the environment."

We are thus brought fairly to the crux of our problem. What are we to understand by environment? We have what we call external environment, which is post-natal. The native from the Arctic Circle to the Equator in every part of the globe is subject to it. The Ojibway Indians of Champlain's time on the shores of Lake Superior are pictured as almost naked in their sun-dances and as living on game, fish, and herbs; while the Iroquois had their villages and cultivated lands and great tribal federations. Similarly the Tasmanian bushmen of the southern hemisphere remained savages, while the Maories of New Zealand were a proud and intellectual race with federated organization and well developed ideas of land ownership. Evidently there is much in transmitted qualities in spite of mere climatic environment. On the other hand if we compare Col. Ogle Thorpe's settlements in Georgia of the people from the slums of London placed where the environment was negro slavery with the thousands of the criminal class shipped to Australia, we must confess to the potential influence of environment both physical and human in each case. Indeed, it is this latter to which we must lend our attention. Take city life with its persistent high tension, with its constant attacks upon the nervous system, both through business and pleasure, whether in high finance or in the competition of trade, whether in the pursuit of the science of medicine, or even in the charities and other social work. It appears to me that we have to widen our outlook in order to observe the broad effects of urban modern life on the one hand and on the other to endeavor to realize what internal environment means. Similarly there is prenatal environment. We understand the rapidity of cell multiplication and know that there is cell differentiation in the ovum. We further know that from the simplest particle of vital protoplasm through all the stages of cell evolution up to pyramidal brain cells and those of the ductless glands such depend upon normal nutrition for their growth while we learn from feeding experiments, as well as investigations into the antecedents of monsters in animals at birth of the distinctly injurious effects upon young chicks during incubation of irregular heating, deficient moisture and impure air as well as of the destructive effects upon the foetus of systematic poisons, whether mineral as in lead poisoning or of infectious diseases as in smallpox which often result in its death. But much more serious because more general are the hammreing effects, to use a mechanical term, of urban life upon the nervous system. Every observant physician, taking stock of his female patients, endeavors to remove the prospective mother from an untoward environment when he notices the undue strain upon her nervous system. For multitudes of the poorer class rest is impossible; but Nature with her resources has often through their habits of labor supplied the defence or an originally less impressible nervous system with a rugged nutrition, the outcome of physical labor But to many women the noise, the rush, the excitement in their daily lives results either in a complete nerve exhaustion or in a neurasthenia though occasionally in a response of Nature to the demand for an extra output of energy when under physical pain or some great emotion as war an abnormal resistance is developed through the sympathetic nervous system. But it is most true as expressed by John Martin that "Appallingly common are the cases of girls with these nervous organizations and delicate brains, whose latent maturity has been rendered a torture by the exhaustion following on their conscientious obedience to the demands of school and college, of social work, or society life." The most noticeable gross effects are seen in the general reduction in the birthrate in all progressive countries where urbanization is going on rapidly. Thus Dr. Newsholme, Chief Medical Officer, has estimated that had the birth rate of England and Wales been the same in 1914 as in 1876 there would have been 467,837 more infants born there in 1914 than actually saw the light. In a recent report to the Prussian Diet it was stated that there were 560,000 fewer births in Germany than would have occurred if the birthrate of 1900 had been maintained. It was further declared that the decline in

birthrate in Germany in twelve years had been as rapid as that in France in seventy and that births had dropped 75 per cent. more than the number of deaths. The most important speakers at the Society dealing with the problem pointed out that the cause is essentially economic, the average marriage age for men being now 29 and for women 26. Earlier marriage was urged as tending to lessen syphilis and illegitimacy. There are 180,000 illegitimate born every year in Germany. The recognition of the serious effects upon the child, in its prenatal stage, as well as upon the mother of disease and disturbed mental conditions is illustrated in the very successful work being done in Maternity Hospitals through the care of the mother during this period. Thus in 34 cases treated in Edinburgh during three months 17 had albuminuria yet 33 were safely delivered; but there were 46 per cent. of still births, although 80 per cent. of the mothers were married. The obvious need for ante-natal clinics is thus made apparent.

We have thus illustrated the general effects of environment on prenatal health and may now revert to the direct influence of tuberculosis during this period. All will have noted how the progress of tuberculosis often for the time is stayed during pregnancy. Foetal life often greatly stimulates appetite and nutrition in the mother, only to be followed by a complete breakdown during lactation. During gestation, therefore, it may be that the toxic effects of the tuberculous process are lessened or that they may act as an immunizing factor in the child; but the large number of tubercular cases, where the child becomes apparently directly inoculated from the mother after birth, suggests that the amount of antecedent immunization must have been small. Regarding its direct effects in providing feeblemindedness, Tredgold, like Goddard, says: "I believe that ancestral tuberculosis is but rarely the direct sole cause of amentia; but my observation shows that like alcoholism, it has an important indirect and possibly also a contributory influence. This indirect effect is seen in its potency to produce the milder and initial forms of nervous instability in the offspring such as migraine, hysteria and neurasthenia, a clinical fact which has been frequently noticed. It is very remarkable how in the works of the two great authorities on amentia quoted each constantly turns to the condition of neuronic instability, which finds its daily illustration and expression in the effects of modern urbanization. Let any family physician declare his experience and he will tell that his chief energies are spent upon patching up systems, where there is anaemia, malnutrition, functional disturbances of organs, inability to perform normal duties and where some nerve whip or tonic is frequently being required, much of this condition soon disappearing with rest under changed environment as at some rest-cure. In many of this class certain common symptoms are observable, such as an actual dislike of even physical distress at the appearance of the older, coarse forms of food as fats, oatmeal and so on, and a longing for sweet or spiced foods which excite appetite or stimulate the gustatory nerves. Indeed, it is abundantly plain that the food of the well-to-do in America is usually very different from that of the sturdy immigrant peasant whether Russian, Austrian or Italian, while it is very probable that amongst the other vices of our civilization that of an irrational dietary and of foods of imperfect nutritive elements due to the robbing of our common foods, as the grains of their salts and vitamines is not the least important. What we are assured of is that though the protective and preventive measures against the direct attacks of tuberculosis and other infectious diseases are being constantly multiplied by science and official supervision, yet the breaking down of the nerve defences proceeds constantly through the thousand and one modern influences hammering at our brain through the special sense, as noises, movies and the dissipating effects of abnormal occupations and of irregular hours which exhaust the physical powers and the ability to resist degenerative or malign causes operating against the normal physical and mental processes. We have observed the phenomenon of how in almost every country, certainly in North America the rural population of 50 years

ago was 25 per cent. of the total, while in the United States and Canada at least 50 per cent. of the total population is to-day urbanized in cities of 5,000 or over; that probably 25 per cent. more are sub-urbanites and in small villages and towns leaving but 25 per cent. actually engaged in agriculture. The effects of the change upon two succeeding generations are now becoming apparent and we are seriously asking ourselves whether phylogency will disappear in its old normal developmental influences to be replaced by some modern man-created eugenics, adequate to cope with the changed environment including habits of life, housing, occupation and education. We know that our total death rate as in New York has been cut in two in fifty years, but we likewise know that the saving is due almost solely to the application of what we may term artificial methods. To give some instances:

1. We have enormously limited the birth rate, leaving, we are told, just so much more time to care for the new-born.

2. The nursing mother has, however, almost disappeared, while much more time is occupied in the attempts to make the child of the neurotic mother with its hyper-sensitive nerve reflexes of the digestive organs digest artificially prepared foods.

3. The child with no green pastures to run in beside the still waters, is at the best conveyed from the flat to the nearest park by the typical nurse girl, although, indeed, most urban children are born and bred in the tenement and suffer from all its limitations.

4. The mental environment is artificial under all these conditions and in northern climates the limitations caused by six months or more of our modern housing have produced and will produce a type which as Creighton Browne says, "are distinctly more jumpy than we used to be."

5. My observations and the teachings of psychology based on physiology make it apparent that with the absence of a Nature environment at a time when the special senses are absolutely normal in their ability to receive impressions the growth of mind, based upon artificial environment will make it more difficult for each succeeding urban generation to wish to get back or to absorb normal even were the wish present, those elementary impressions, which are still the underlying basis of the thoughts of the modern generation. Whether or not modern social processes will develop their physiological or pathological immunizing changes need the new life conditions being so rapidly developed under modern peace and war times, as regards urbanization, inventions and artificial products of every sort must remain to the future for proof. Meantime the degeneration of tissue or the wearing-out process has become statistically recognized even in slow-going England, while every hospital, sanatorium, asylum, refuge and "home" and their class is ever increasing—is filled with the casualties due to this modern war against normal natural processes.

The following table showing the growth of hospitals and patients in Ontario is both instructive and hortatory:

	Total Hospitals in Ontario	Total Paitents	Total Population of Province	Ratio of Patients in Population
1880	12	5237	1,926,922	1 in 369
1890	24	10523	2,114,321	1 in 200
1900	52	29761	2,189,947	1 in 72
1908	69	46971	2,280,459	1 in 48
1910	79	53692	2,523,274	1 in 47
1915	91	85759	2,598,320	1 in 30

If by artificial methods we may greatly limit tuberculosis we still shall have a problem of feeblemindedness to attack, which will for an unknown period under modern life conditions give our legislators educationalists, clerics and physicians ample occupation, if they are to solve the problem satisfactorily.

POLIOMYELITIS (INFANTILE PARALYSIS)

By Wade H. FROST, Passed Assistant Surgeon, United States Public Health Service.

IN VIEW of the present outbreak of infantile paralysis (poliomyelitis) in New York City the following discussion of the etiology and epidemiology of this disease is taken from Hygienic Laboratory Bulletin No. 90, with some revision by the author. This discussion, based on an extensive review of the literature and on the author's personal studies of the epidemics previously reported, is presented as a summary of the present knowledge concerning the cause and transmission of poliomyelitis, with such opinions as seem justified by the facts.

The essential facts brought out by the experimental studies of poliomyelitis are the following:

The specific cause of poliomyelitis is a minute microorganism, a so-called virus, capable of cultivation in vitro on suitable media.

The virus derived from human cases is pathogenic for apes, producing in them characteristic effects essentially similar to those produced in man. As is the case with many other pathogenic organisms, considerable variations in virulence are noted.

The only animals other than apes which have been found definitely susceptible to the infection are rabbits. The susceptibility of these animals to the infection appears highly inconstant, and the effects produced are both clinically and anatomically quite different from those produced in monkeys. Romer has found guinea pigs susceptible to an infectious paralytic disease strikingly similar to poliomyelitis, and Neustaedter has recently made observations suggesting that the guinea pig may at times be susceptible to poliomyelitis.

In the human body the virus has been found: (a) In the tissues and secretions of persons dead of poliomyelitis, namely, in the brain, the spinal cord, the mesenteric glands, the tonsils, and in the mucous secretions of the naso-pharynx, the trachea, and the intestines, (b) In the secretions of persons acutely ill with poliomyelitis, namely, in the naso-pharyngeal secretions and in washings from the rectum.

The infectivity of these secretions has been demonstrated not only in persons suffering from the clinically typical paralytic forms of poliomyelitis, but also, though less conclusively, in the secretions of those suffering from mild, clinically indefinite, abortive forms.

(c) In the naso-pharyngeal and intestinal secretions of persons convalescent from acute attacks of poliomyelitis. Although the total number of recorded examinations of convalescents is as yet small, the results of studies by Kling, Wernstedt, and Petterson suggest that in a very large proportion of persons recovering from poliomyelitis these secretions remain infective for several weeks or even months.

(d) In the naso-pharyneal secretions of apparently well persons who have been more or less intimately associated with other persons suffering from poliomyelitis, chiefly in epidemic foci. No figures are available as yet to form an estimate of the proportion of persons who, upon exposure to infection with poliomyelitis, become "carriers," or of the relative proportions of carriers and clinically recognizable cases of poliomyelitis in an epidemic focus. The technical difficulties in the way of demonstrating the virus, involving the injection of filtrates into monkeys, are such that extensive statistics upon this point can hardly be expected in the near future, unless the technique of the demonstration can be greatly simplified.

Outside of the human body the living virus has been demonstrated in nature only in the dust of rooms occupied by poliomyelitis patients and presumably contaminated with their secretions, and possibly (though the demonstration is not fully convincing) upon articles recently handled by persons suffering from poliomyelitis.

In brief, there is at present experimental proof of the following sources of infection: The secretions of persons ill with poliomyelitis, those convalescent from the infection, and "passive carriers"—that is, persons apparently well who

*Reprinted from U. S. Public Health Reports, July 14, 1916.

are harboring the specific virus and discharging it in their secretions.

As to the avenues through which the virus may enter the human body to cause infection, inferences may be drawn chiefly from experiments upon lower animals. Monkeys may be experimentally infected by injection of the virus directly into the brain, or the subdural space, into the general circulation, the peritoneal cavity, or even the subcutaneous tissue. They may also be infected by rubbing the virus upon the scarified mucous membrane of the nose, and even by rubbing it upon the uninjured mucous membrane. Also, by the use of massive doses of the virus and under quite artificial conditions, it has been found possible to produce infection by feeding monkeys through a stomach tube.

Of the various methods of infection experimentally shown to be possible, infection through the nasal mucosa appears to be the most constant under conditions which might be expected to be approximated in nature.

Concerning the natural vehicles of infection, experiments performed under laboratory conditions are necessarily somewhat inconclusive. The infectiousness of the nasopharyngeal and intestinal secretions of infected persons and the susceptibility of monkeys to infection through the nasal mucosa indicate very strongly that the disease may be transmited in nature by such vehicles as may serve to transmit these secretions from infected persons to the respiratory (or digestive) tracts of others—that is, by more or less direct personal contact. The resistance of the virus to the influence of drying and sunlight suggests the probability of the infective agent being conveyed in dust and in fomites, a suggestion strengthened by the experimental evidence of the infectivity of dust from the sick room.

Experiments showing the possibility of transmitting the infection from monkey to monkey through the agency of a biting fly, Stomoxys calcitrans, and in one instance through the bedbug, have added considerable weight to the hypothesis that poliomyelitis is in nature an insect-borne disease. However, since the transmission of the disease through these insects has proven possible in only isolated instances and under highly artificial conditions, these experiments do not warrant the conclusion that stomoxys or other insects play any important part in the natural dissemination of the disease in man.

On the whole, the experimental evidence, taken alone, while not excluding other means of transmission, points to the conclusion that poliomyelitis is a contagious disease, spread from person to person through interchange of infectious secretions, the sources of infection being the clinically definite and clinically indefinite acute cases of poliomyelitis, convalescents, and passive human carriers.

To give the epidemiological characteristics of poliomyelitis in general terms is difficult, not only because of the wide variations noted in different epidemics, but also by reason of the comparative paucity of statistics affording but a slender basis for generalization. Still, making due allowance for numerous minor exceptions which can not be noted in a brief discussion, certain general epidemiological characteristics stand out as fairly well established.

1. Geographic distribution.—Poliomyelitis is, even in the light of our admittedly imperfect statistics, known to be of practically world-wide distribution. Without attempting to enumerate the localities from which it has been reported, the following examples of localities where epidemics have occurred in recent years may serve to illustrate how far the occurence of epidemics must be independent of such special climatic or other conditions as are peculiar to any restricted part of the globe.

Since 1905 epidemics have occurred in Europe from Scandinavia to the Mediterranean, from the British Isles to the Danube, in North America from Alaska to Alabama, throughout the breadth of the continent; in the West Indies; in South America; in Australia, and in the South Sea Islands. Thus the disease has occurred in more or less extensive outbreaks in both Eastern and Western Hemispheres under extremes of latitude from the Equator to the northern Temperate Zone. It is noteworthy, however, that the most extensive outbreaks recorded have been in the northern portions of Europe and in the northern section of the United States,

and Canada. The southern sections both of Europe and the United States, while not immune, have suffered less severely.

2. Seasonal prevalence.—In respect to season as to climate, poliomyelitis occurs under widely varying conditions. In the latitude of the northern United States cases have occurred, during the last few years, in every month of the year. Nevertheless the disease has a very distinctly characteristic seasonal prevalence, very constantly reaching its maximum both of sporadic and epidemic prevalence during the summer and autumn months, usually during the late summer and early autumn, and declining markedly during the late fall and early winter, to reach its lowest prevalence in midwinter and spring. In the Southern Hemisphere the disease reaches its maximum prevalence from December to May, the months corresponding to the summer and autumn of northern latitudes. On the Pacific coast of the United States, where the difference between summer and winter is more in the matter of rainfall than of temperature, poliomyelitis has occurred mostly during the dry summer season.

On the whole this seasonal prevalence may be accepted as one of the most constant characteristics of the disease. In respect to the season of maximum prevalence poliomyelitis is in contrast with the more common diseases generally believed to be transmitted by direct contact and to find access to the body through the respiratory tract, such as scarlet fever, measles, diphtheria, whooping cough, etc., which usually reach their highest prevalence in the autumn, winter and spring. In this respect, its seasonal prevalence, the disease more closely resembles infections of the digestive tract and diseases transmitted by such insects as are most prevalent in summer.

3. Sporadic and epidemic occurrence.—Poliomyelitis may be considered to have been endemic, for a considerable number of years at least, in the United States and Europe. Although the statistics are very fragmentary, it would seem a conservative statement that cases now occur every year in every State, and probably in every large city of the United States. Also, at least as regards the large cities, these is good reason to believe that this has been true for a number of years, since long before the disease began to attract attention by its occasional occurence in epidemics.

This fact is of importance as indicating that the recent epidemics can not be ascribed to the introduction of a new infection, and that there probably are scattered throughout the country reservoirs of infection, capable of giving rise to the widely scattered so-called sporadic cases.

4. General characteristics of epidemics.—In undertaking any generalizations upon the characteristics of epidemics of poliomyelitis, it must be emphasized that to almost any broad general statements there are numerous exceptions, since epidemics vary most strikingly. For example, between the outbreak reported from Hancock County, Iowa, and that in Cincinnati, Ohio, are such radical differences as might be expected between epidemics of two essentially different diseases. Yet, with due regard to the exceptions, the following are believed to be, in general, the essential characteristics of epidemic outbreaks of poliomyelitis, as shown by numerous studies.

(a) Irregular geographic distribution of epidemic foci.—Almost if not all epidemic diseases affecting man, even those transmitted chiefly from the lower animals or through insects, are disseminated by travel and traffic, and, in their spread from a given point, are naturally expected to follow the chief routes of traffic. It has, however, been noted of epidemics of poliomyelitis that they are often, if not usually, of irregular occurrence, not showing the distribution which would be expected as the result of dissemination along the main highways of traffic.

For example, the epidemic of 1907 in and around New York City, while it apparently extended north into New England, did not extend south to the nearby and intimately connected city of Philadelphia, nor west to the large cities in close communication with New York. The more recent epidemics of 1908, 1909, and 1910, in Minnesota, Nebraska, Iowa, and Kansas, are commonly, and perhaps justly, regarded as sequelae of the epidemic of 1907 in New York, yet up to this time no epidemic has been recognized in Chicago, through which passes practically

all the traffic from New York to the above-mentioned States. Again, in 1910, there occurred a rather severe epidemic in Washington, D.C., and a proportionately smaller outbreak in Philadelphia, while Baltimore, lying between these two cities, and in daily close communication with both, escaped without an epidemic—with at most only an increase in the number of endemic or sporadic cases. Numerous other instances might be cited where epidemics have failed to extend from a given focus to communities which appeared to be most intimately exposed and to offer equal opportunities for the spread of the infection. Such instances alone give the impression that epidemics may be due to a "place infection" not transferred by human travel—an infection of local water or food supplies, of insects or of domestic animals, whose range of travel is generally more restricted than that of man.

(b) Rapid spread over wide areas.—There are, however, other and almost equally numerous facts which argue against a "place infection' as the cause of epidemics, the chief of these being the rapid spread of epidemics over wide areas, as, for example, the spread over a whole State within a period of a few months. Of such rapid spread over wide areas of country there are numerous instances, in some of which it has appeared upon close study that the spread was in a general way radial from the earliest focus. This is illustrated by the course of the epidemic of 1910 in Iowa, and rather striking instances of similar rapid radial spread are given by Wickman in his account of the epidemic of 1905 in Sweden, and by Kling in his description of the Swedish epidemic of 1911. Such rapid spread over a large territory practically disproves the hypothesis that epidemic outbreaks are due to place infection independent of and not transferred by ordinary human traffic, since it is quite improbable that place infection of numerous localities within the same general territory should develop independently at the same time. The rapidity of spread has, too, in many instances, been such as to confirm the supposition that man, the most rapidly and widely travelling animal, is the carrier of infection.

Both in its rapid spread over large areas and in its irregularity, skipping localities to which it might logically be expected to extend, poliomyelitis finds an analogy in cerebrospinal meningitis, a disease which we now have excellent reasons to believe is directly contagious, being spread from person to person chiefly through the agency of passive human carriers. These characteristics, therefore, do not necessarily indicate insect transmission nor argue against the direct transmissibility of poliomyelitis.

(c) Small total incidence in the population affected.—Even during so-called epidemics, poliomyelitis has characteristically a small incidence in the total population. To be sure, instances are not wanting of epidemics in which a large proportion, over 1 per cent., of the total population has been attacked; but these are rather exceptional instances and are practically confined to outbreaks in small towns and small rural areas. In a large aggregation of people, such as the population of a city with over 100,000 inhabitants, a county, or a State, epidemics seldom attack more than one in a thousand of the population, often not more than one in two to four thousand. The incidence of poliomyelitis, therefore, even in epidemics, is frequently less than the usual annual incidence of several of the more common endemic infectious diseases in the same communities, and strikingly less than the incidence which these common diseases frequently attain during epidemics. Notwithstanding this small incidence in the population, epidemics of poliomyelitis are self-limited, invariably declining in any limited area, as a single city or county, within a few months, and as a general if not invariable rule not recurring in that locality for a period of at least two years. This characteristic decline of epidemics after only a very small proportion of the population has been attacked, appears not to be due to exhaustion of the sources or the vehicles of infection nor to be dependent altogether upon seasonal conditions. It is, in fact, difficult to account for on any hypothesis other than that of the exhaustion of susceptible material in the population.

(d) Incidence in rural and urban communities.—The recent occurrence of epi-

demics of poliomyelitis in so many countries, under such widely varying conditions, alike in tropical and frigid countries, in densely populated cities and in thinly settled remote country districts, has already been cited as showing conclusively that no set of conditions peculiar to any given locality is necessary for the development of an epidemic. It has, however, been observed as a very general rule that in small towns and in the country epidemics are more intense than in large cities, attacking a larger proportion of the population. This has been found true not only when individual small towns are compared with large cities, but also for groups of all the smaller towns or all the rural population of a State, compared with all the large cities in the same area. The proportionately greater rural prevalence has in fact been so constant as to be unmistakably due not to mere chance but to some fundamental law. It is to be remembered, however, that this applies to epidemics; whether or not the same is true of the endemic or sporadic occurrence of the disease is not fully established. Although the records of the Massachusetts State Board of Health relative to the prevalence of poliomyelitis in that State for five years would seem to indicate that the prevalence has been constantly greater throughout that time in the rural towns than in large cities, yet even there a large proportion of the cases reported each year have occurred in small epidemics scattered throughout the State rather than as sporadic cases.

In respect to its greater rural than urban prevalence, poliomyelitis has often been contrasted to such contagious diseases as measles and scarlet fever, which are quite constantly more prevalent in densely populated cities, and this contrast has been used as an argument against the contagiousness of poliomyelitis.

However, though the endemic prevalence of scarlet fever and measles is greater in large cities, data, which are as yet scant and incomplete, indicate that epidemics, even of these diseases, attain a higher incidence in the population of small towns and rural communities than in the population of large cities. Certainly it is true, at least of measues, that epidemics attain their greatest intensity in communities which have long been free from the infection; witness, for example, the devastating epidemics reported from the Faroe Islands and other remote communities. There is indeed ground for the view that the potential epidemic prevalence of a disease like measles is, in a measure, inversely proportional to its endemic prevalence. Therefore, in regard to poliomyelitis, the fact that epidemics reach a higher incidence in rural districts can not be taken by itself as indicating that rural conditions are necessarily more favorable for the spread of the infection. Before such a conclusion can justly be drawn it will be necessary to show that its endemic or sporadic occurrence is also constantly less in the large cities.

(e) Distribution among the various elements of the population in epidemic foci.—The close study of epidemics has shown that the incidence of poliomyelitis is proportionately about the same among persons living under good and those living under poor hygienic conditions. This practically eliminates from consideration as of great importance in the causation of the disease such factors as are intimately associated with poor hygienic conditions —such factors, for example, as insufficient and improper food, overcrowding, personal uncleanliness, and association with verminous insects.

No constant difference in regard to the incidence of poliomyelitis has been observed between the different races and nationalities constituting the population of areas where the disease has been epidemic. Nor has any constant relation been shown between the incidence of the infection and the topographic features of the various sections of the affected areas.

In one respect, however, poliomyelitis is constantly and very strikingly selective in its incidence, namely, in respect to age, its greatest incidence being always among children, especially those in the first half decade of life. Children under five years of age, constituting, in this country, from 9 to 12 per cent. of the total population, furnish usually from 50 to 90 per cent. of the cases of poliomyelitis. In some epidemics the disease is almost as prevalent proportionately in children between the ages of 5 and 15 as in those under 5 years of age, but adults

(those past the second decade), constituting usually over 50 per cent. of the total population, seldom furnish more than 10 per cent. of the cases, usually a very much smaller proportion. In the Buffalo epidemic of 1912 the incidence of poliomyelitis in children under 5 years of age was fifty times greater in proportion to their number than in persons from 5 to 24 years of age, while the whole population over 24 years of age, more than 50 per cent. of the total inhabitants of the city, remained entirely immune from attack.

As to the significance of this characteristic age incidence of poliomyelitis, its enormously greater incidence in children, it must indicate on the part of the children, either a generally greater exposure to the infective agent or else a greater susceptibility to its effects. So far as I am aware it has never been satisfactorily demonstrated that the children in any large epidemic focus were considerably more exposed to any probable source of infection than were the adults of the corresponding families. To be sure a number of suggestions have been made as to possible ways in which children might be generally more exposed to certain sources of infection than adults. For example, children drink milk more generally and more freely than do adults, but in every considerable epidemic of poliomyelitis of which I am aware, where the data collected have been sufficient, milk supplies could be quite definitely excluded as probable vehicles of infection. Moreover, milk-borne epidemics of other infectious diseases, as typhoid fever and scarlet fever, while characteriezd by a high rate of incidence in children, are not so strikingly—almost exclusively—confined to children as are epidemics of poliomyelitis. Even the proof that poliomyelitis is characteristically a milk-borne infection would not, therefore, offer an altogether satisfactory explanation of its very excessive incidence in children under 5 years of age and of the almost complete immunity of adults.

Again, on the hypothesis that poliomyelitis may be transmitted by biting insects, it has been suggested that children are more exposed to infection in this way because of their scantier summer clothing and their inability to ward off such insects as readily as do adults. It seems altogether improbable that these considerations are sufficient to account for an incidence fifty times greater in children than in young adults; and, as a matter of fact, epidemic diseases known to be transmitted by biting insects (yellow fever, bubonic plague, typhus fever) are not, in nonimmune populations, characteristically children's diseases.

It has also ben suggested that the infection may be commonly contracted from the dust of streets and dwellings, and that children, by reason of their habit of crawling and playing on the ground, are greatly more exposed to infection from this source than are adults. Especially as regards street dust it appears very doubtful that children, as a class, are greatly more exposed than adults, since the latter travel more widely over dusty streets. It certainly seems quite improbable that the exposure of children to dust infection is so enormously greater than that of adults as to account for the peculiar age incidence of poliomyelitis, assuming dust as the chief vehicle of infection.

Finally, because of their less cleanly and individualistic personal habits, children are probably more exposed than are adults to direct contagion through infectious secretions, yet experience teaches that contagious diseases in a nonimmunized, generally susceptible population are not disproportionately prevalent in children. As examples may be cited smallpox in unvaccinated communities, measles in new territory, typhoid fever in communities where contact is the chief factor in its spread.

On the whole it may be said that epidemiologic studies up to this time have failed to demonstrate greater exposure of children than of adults to the infective agent of poliomyelitis, and that the hypotheses put forward to explain an assumed greater exposure are not competent to explain it. The only hypothesis which appears to satisfactorily explain the enormously greater incidence among children is that they are, in general, more readily susceptible to the infection than are older persons.

Poliomyelitis uite commonly attacks both actually and proportionately more males than females. The disproportionate

incidence in males, fairly constant in all age groups, is commonly most striking in the ages above 15 years. This is the reverse of what would be expected in a disease transmitted chiefly by direct contact with the sick. Females over the age of 15, being more commonly in contact with the sick in the capacity of nurses, would be expected to develop the infection more frequently than males of the corresponding ages, and such is actually the case with scarlet fever and diphtheria. Since males of this age are more commonly out of doors and away from home than are females, the greater incidence of poliomyelitis among adult and adolescent males than females has very naturally suggested that the disease is usually contracted from some source other than the immediate environment of poliomyelitis patients, perhaps from some outdoor source, as from the soil, domestic animals, or outdoor insects. The greater incidence among males than among females is, however, not altogether incompatible with the view that the disease is really contagious, being transmitted usually through apparently healthy virus carriers. Males, whose business relations generally bring them into contact with more people, would theoretically have more chances of infection from carriers than females, and, assuming equal susceptibility, would more frequently develop the disease.

(f) Local sources and routes of infection.—Notwithstanding the minute care with which a considerable number of outbreaks of poliomyelitis have been studied, it has almost invariably been impossible to trace, with any degree of accuracy, the exact origin and routes of dissemination of the infection. Among the exceptions to this statement may be noted some of the small outbreaks described by Wickman, where it was possible to trace fairly definite lines of direct and indirect contact between cases; also a small outbreak, likewise reported by Wickman, where the evidence suggested that the infection had been spread through a common milk supply. These, however, are exceptional instances. In general the epidemiologic study of outbreaks has yielded only negative results. The very fact, however, that the results of study are usually negative has a certain significance.

For example, mass infection of common water and food supplies has been quite generally and definitely eliminated as a probable means of dissemination in the epidemics studied.

It has already been noted that it is usually impossible to trace any definite connection between the incidence of the disease and the immediate environmental conditions under which the various elements of the population live. This is rather strong evidence that the spread of infection is largely independent of such factors as overcrowding, improper feeding, personal uncleanliness, and the presence of vermin.

In a general way, the incidence of poliomyelitis in different communities has appeared to be roughly proportional to the number of domestic animals present. This is, however, perhaps only another method of stating that the disease has been commonly most prevalent in rural and semirural communities, where domestic animals are usually more numerous in proportion to the population than in large cities. There is no conclusive evidence of a characteristically greater incidence of infection among those persons who, by reason of their occupation or their residence, are most closely and intimately associated with domestic animals.

Domestic animals suffering from paralytic affections, clinically similar to poliomyelitis, have often been found in communities where poliomyelitis was epidemic but these animals have not appeared sufficient, either in numbers or in the intimacy of their association with cases of poliomyelitis, to account for the epidemics. Also, it has not been shown that the paralyses of animals are essentially similar to human poliomyelitis. Paralytic diseases of lower animals are not very uncommon, and though they have not been fully studied it appears that they may be due to a variety of causes. It is not even proven that such diseases are actually more common during epidemics of poliomyelitis is due to the fact that they are more apt to be noted and reported in communities where the epidemic prevalence of poliomyelitis has attracted attention to them.

Peculiar topographical or meteorological conditions can not be held to account

for epidemics, since, as already noted, the range of conditions under which epidemics have occurred is very wide. The unprecedented prevalence of poliomyelitis in certain sections of the United States in 1909 and 1910, during unusually dry seasons, gave considerable color to the hypothesis that deficient rainfall, with the consequent excessive prevalence of dust, was an important factor in the causation of epidemics, but broader experience has not confirmed this supposition. The fact that an epidemic of poliomyelitis may be declining in one community while in another, so near by as to be under approximately identical meteorological conditions, an epidemic may just be developing, is a further indication that the development and decline of epidemics are to a considerable extent independent of the weather conditions.

The evidence in regard to the contagiousness of poliomyelitis may be considered from two points of view: First, from the incidence of the disease among persons known to have been intimately associated with poliomyelitis patients, and second, from the proportion of recognized cases in which evidence could be obtained of association with previous cases.

The statistics presented in this report show that of 2,070 persons exposed to poliomyelitis by residence in the same house and same families as poliomyelitis patients, only 14 (0.6 per cent.) developed the disease in frank paralytic form. Even assuming that all of these actually contracted their infections from association with the sick members of their families, the contagiousness of poliomyelitis must still be very slight—less than one-fifteenth that of scarlet fever, as shown by Chapin's extensive statistics, compiled on a similar basis. The inclusion of abortive cases, which, though not developing paralysis, may be conservatively diagnosed as poliomyelitis, approximately doubles the apparent contagiousness, which is still further increased (to 3.2 per cent.) by the inclusion of less definite suspected cases. Yet, even including these indefinite suspicious cases, it is only in exceptional small outbreaks that the attack rate of poliomyelitis among exposed persons approximates that of scarlet fever or diphtheria. Similar evidence of the slight contagiousness of poliomyelitis has been afforded by its very small incidence among large groups of children exposed to contagion by association, in schools and institutions, with acute cases. The exceptions to this, as the outbreak reported in Hancock County, Iowa, and some small outbreaks reported by Wickman, do not invalidate the general truth of the statement, which is supported by a large mass of more or less definite observations reported by numerous observers from all parts of this country and Europe.

Taking up the evidence of contagiousness from the other point of view, namely, by attempting to trace cases back to association with previous cases, the statistics presented in this report agree with the observations made in most epidemics, that only a small proportion of cases can be ascribed to known contact with previous definite cases of poliomyelitis. Even including association with merely suspicious cases of illness, the majority of cases of poliomyelitis can not be traced to known contact, either direct or indirect, with any previous case. It is this apparent lack of relation between cases which has led so many investigators to seriously doubt or even deny the transmissibility of the disease.

On the whole it may be fairly definitely concluded that if poliomyelitis is transmissible from person to person through either the respiratory or the gastrointestinal excretions, it must be rather slightly or rarely transmissible, since the disease develops in such a small proportion of persons known to be intimately associated with acute cases. It also seems well established that the recognized cases of the disease must be relatively unimportant sources of infection. This follows necessarily, because a large proportion of the cases studied have been in persons not associated in any known way with previous recognized cases—often under circumstances which precluded the possibility of even indirect contact unless through the intervention of even indirect contact unless through the intervention of not one but a series of unrecognized carriers. In short, if poliomyelitis is a contagious disease confined to human beings, as certainly seems most probable at this time, the chief sources of infection must be cases

of illness not recognized as poliomyelitis, or, more probably, apparently healthy carriers of the virus.

(g) Evidence of transmission by insects.—Aside from the evidence that poliomyelitis may be transmitted experimentally from infected monkeys by biting insects (bedbugs and stable flies), and that the virus may be mechanically carried upon and in the bodies of common house flies, the evidence in favor of the view that the disease may be in nature insect-borne is based upon certain broad epidemiological peculiarities and the results of intensive study of local outbreaks.

The broad epidemiological peculiarities and the results of intensive study of local outbreaks.

The broad epidemiological peculiarities which at once sugest that some insect is a necessary agent in the transmission of poliomyelitis are a seasonal prevalence corresponding to the season of maximum prevalence and activity of numerous insects; greater intensity of epidemics in rural than in urban communities; and the irregular spread of epidemics, suggesting that some local factor as yet unrecognized must be present in order that an epidemic may develop.

The insects which can merit consideration as necessary or even important factors in the transmission of poliomyelitis may be expected to exhibit the following characteristics:

Distribution over an approximately world-wide territory.

Maximum prevalence and activity during the late summer and fall months, but in the North Temperate latitudes a certain though diminished prevalence and activity throughout the year.

Prevalence in large cities, small towns and rural districts.

Comparatively uniform distribution among the various social strata, among persons living under good and those living under poor hygienic conditions.

As to the seasonal prevalence of poliomyelitis, it is not so definitely limited to the warmer months as would be expected if the disease is transmitted by some outdoor insect, such as mosquitoes or biting flies. It has certainly not the sharply defined seasonale prevalence of yellow fever. On the other hand, it has a more sharply defined summer and autumn prevalence than would be expected in a disease transmitted by insects more strictly parasitic to man, as bedbugs, lice, and fleas. Typhus fever transmitted by the louse is rather a winter than a summer disease, and bubonic plague transmitted by fleas is by no means limited in its prevalence to the warm seasons.

As noted elsewhere in this report and in previous publications, the seasonal prevalence of poliomyelitis corresponds in a general way to that of typhoid fever, especially to that of rural typhoid and the "residual" typhoid of cities with good water supplies; and even more closely to the seasonal prevalence of infantile diarrhea and enteritis. Therefore, while the seasonal prevalence of poliomyelitis is markedly dissimilar to that of most so-called contagious diseases believed to be respiratory infections, it is at least as nearly like that of digestive-tract infections as of any known insect-borne disease.

The greater rural than urban intensity of epidemics of poliomyelitis has already been discussed, and mention made of the fact that the data now available do not prove the existence of more favorable conditions for the spread of infection in rural communities; they may even be interpreted as indicating a lesser rate of endemic prevalence in the latter than in large cities.

The fact that the most careful study of discrete outbreaks has often failed to discover any avenues of contact between cases has suggested to a number of students of the subject that the infection was disseminated through insects capable of travelling or being carried for considerable distances. The assumption that insect transmission offers any explanation of the scattering rather than grouping of cases is of doubtful validity, contradicted rather than supported by actual observation of epidemic diseases known to be transmitted by insects. Certainly the grouping of cases in close proximity to each other or their association with some definite focus is quite characteristic of epidemics of yellow fever, typhus, bubonic plague, and fly-borne epidemics of typhoid fever. The travelling habits of the stable fly might appear to account for

the occurrence of cases of poliomyelitis in persons at a considerable distance from the original source of infection, but even so it would be expected that if this were the usual method of transmission cases would be more grouped in localities where these flies are strikingly abundant, as in the vicinity of large stables, and that infection would be noticeably common in persons whose occupation greatly exposes them to the bites of stomoxys, as teamsters and hostlers.

Again, two facts which fail utterly of explanation by the theory of insect transmission per se are the small total incidence of poliomyelitis, and more especially its preponderating incidence in children. Diseases known to be insect-borne are not characteristically more prevalent in children than in adults, nor is there any obvious reason why they should be unless children are more susceptible to the infection. The hypothesis of insect transmission, therefore, like that of transmission by direct contagion, leads back to the assumption of general immunity to the infection on the part of adults and to unrecognized sources of infection.

On the whole, while there is much to suggest that poliomyelitis is insect borne, its epidemiology appears to be equally well explained on the theory of direct transmissibility through infectious secretions, and the latter theory is at present supported by more experimental evidence than is the theory of insect transmission.

Summary.

Reviewing briefly the data and considerations which have been discussed, poliomyelitis is due to a specific infective agent of which the only demonstrated natural sources are infected human beings, who may be divided into the following groups: The recognized sick, convalescents, the sick not recognizable as poliomyelitis cases, and passive virus carriers apparently in good health. The infective agent is known to be discharged from these sources in the excretions of the respiratory and digestive tracts; it is known to be fairly resistant to the destructive agencies encountered in nature outside of the human body. Perhaps the most significant fact in regard to the experimental transmission of poliomyelitis to monkeys is that they may be infected by rubbing the virus on the nasal mucous membrane. Infection through the digestive tract or through the agency of biting insects has been found more difficult and less constant.

The disease is, in nature, of widespread though rare sporadic or endemic occurrence. In epidemics it has occurred in recent years over a large part of the world the outbreaks being sometimes discrete, at other times spreading rapidly, but irregularly, over wide areas. Such epidemics characteristically run a rather rapid course in a given community, declining after a few months or less, after having attacked (so far as is evident) only a small proportion of the total inhabitants, usually not more than one in a thousand; and do not recur in the same locality for a period of at least two years. In epidemic foci children under 5 are attacked much more often than are older persons, the whole adult population remaining virtually immune in some epidemics.

The rapid spread of epidemics over wide areas, their spontaneous decline after only a small proportion of the inhabitants have been attacked, and above all the preponderating incidence in young children have not been satisfactorily explained by any hypothesis other than that the infective agent, during epidemics, is widespread, reaching a large proportion of the population, but only occasionally finding a susceptible individual, usually a young person, in whom it produces characteristic morbid effects. Assuming this rare susceptibility, the well-established facts collected by epidemiologic studies are compatible with the evidence of laboratory experiments that the disease is directly transmissible from person to person.

As to what constitutes susceptibility or the converse — immunity — practically nothing can be deduced except that age is obviously a factor of importance, susceptibility being generally greatest in the first half decade of life, thereafter progressively diminishing until in adult life there is a very general immunity to natural infection. The reason for this is at present a matter of speculation. Conceivably the greater immunity of adults may be due to a nonspecific resistance, developing naturally with maturity.

THE CARE OF CHILDREN UNDER SCHOOL AGE

By David Forsyth, M.D., D.Sc., F.R.C.P.

IT IS COMMON knowledge that the State medical inspection of children, organized some six years ago, has disclosed a widespread condition of ill-health even among the youngest school entrants. Indeed the very first year's experience, as summarized in the annual report of the Board of Education, shattered, once for all, the pleasing fiction that our educational portals were opened to troops of healthy, sturdy children. On the contrary it established the disquieting fact that disease had already laid a heavy hand on a very great number of them. It proved that a large proportion of the oncoming generation was already physically deteriorated at five years old. To give a single illustration. Some 7,500 London children in the infants' departments of the schools were medically examined; more than 5,000 of them were found with teeth already decayed, and, in addition, upwards of 2,000 defects of the nose and throat (mostly adenoids and enlarged tonsils) 600 of the ears and hearing, 450 of the eyes and sight, as well as some 600 other defects of various kinds, made up a catalogue which shocked everyone who was concerned for the national physique.

These results were echoed from all parts of the Kingdom and soon the question was being asked, What must be the early conditions of the life of these children that so few escape unharmed? Only yesterday the State had taken the momentous step of looking after the health of school children, and now another development, no less momentous, seemed about to be thrust on us. For, to put the matter on no higher plane than that of economy, how could the State continue to bear the heavy outlay of detecting and remedying the ill-health of tens of thousands of school entrants, if the less costly plan was to take these cases in hand earlier, when their treatment would be shorter and therefore cheaper and would allow a better chance of cure without any permanent disability? To some it even seemed that the real need was of measures not merely to cure these early defects, but to prevent them in the first instance. During —the past year or so, therefore, interest in child-welfare has gradually turned to children under school age—that is to the period of infancy which is the subject of discussion this morning.

Many pregnant questions suggest themselves. What, for example, are the circumstances favoring this deterioration in the first five years? What conditions are lacking which make for health? Are the roots of all this sickness to be traced back to soon after birth—possibly even earlier? If not, when does the tide of disease begin to rise? These are some of the questions which now have to be answered. But enlightenment on these points was obscured by the want of any previous systematic study of the child population as a whole during its first five years, and little was known of its conditions of health. Not, of course, that the whole of this period had been overlooked. One of the earlier phases of the modern movement on behalf of children was inspired by those grim tables in the Registrar-General's reports showing that something like 5 per cent. of the babies born in this country died before their first birthday; and, as you know, it was to effect a reduction in this mortality that "infant consultations," where babies are kept under regular supervision, were organized in many parts. But just as the Registrar-General's table focused attention on the first year of life, so these infant consultations piloted their charges only so far as their first birthday. Beyond that, all was dark, and nothing more was seen of them until, as school entrants, they took shelter under the Education Authorities—now, however, bearing unmistakeable testimony of hardships and rough weather. Precisely what had happened in the interval can only be conjectured, though this much, at any rate, seemed probable, that the physical defects accounting for most of the ill-health of the school entrants were

*From the Journal of State Medicine, June, 1916.

scarcely to be found among the consultation babies.

This was the stage when the City of Westminster Health Society broke new ground by opening a centre for the continuous medical supervision of children from birth to school age.

This centre, now in its third year, throws some light on the physical deterioration of children under school age. I do not wish to inflict statistics on you, but the following table gives succinctly the results of my examination of the first 660 children who attended the centre.

Age of child	0—1	1—2	2—3	3—4	4—5 years	
Numbers exam'd	294	119	120	79	52	
Decayed teeth	—	1.7	16.7	45.6	55.8	per cent.
Enlarged tonsils	—	6.7	21.7	27.8	30.8	"
Adenoids	3.0	8.4	20.0	39.2	48.0	"
Rickets	19.0	24.4	8.3	5.0	1.9	"

It will be seen that the large majority of children under one year were healthy; of those who were not the greater number were suffering from errors in diet. In contrast to this, only a minority in their fifth year were without at least one physical defect.

Now it would be rash to assume, and I do not wish you to conclude that these results, based on a few hundred children, are an exact index to the condition of the whole infant population under school age, but there is this good reason for believing that our Westminster children are neither much better nor much worse than others elsewhere, namely, that the amount of ill-health that we have found in the first five years leads up to and accords fairly well with the amount that is known to exist in the sixth year among school entrants all over the country. On the whole, therefore, I feel I shall not be guilty of any overstatement when I reaffirm the opinion I expressed a year ago that "large numbers of children, healthy in all respects at birth, become within five years the physically defective entrants whom the Education Authorities are required, at no small cost, to restore as far as possible to their original state of health."

II.

To what causes is this deterioration to be attributed? First among them must be reckoned—since growth is one of the most important phenomena of childhood—the food provided for these growing children. If only mothers would suckle their offspring, this question would become insignificant as a cause of illhealth, but unfortunately hand-feeding is the choice in a great number of cases. In a very few of these no doubt the mother is physically unfit to supply breast-milk, either because none is produced in her breasts or because her own health, enfeebled by disease, cannot support this extra strain, but most often the choice is made either because the mother's work keeps her from her baby, or because her better judgment is overborne by the assertive claims put forward on behalf of this or that proprietary food. But these foods are rarely inexpensive, and sooner or later most of these mothers fall back on cow's milk, never realizing, it must be supposed, how deadly a food it can be, especially in the poorer parts of large towns. A considerable proportion of the daily supply is tuberculous, more still is contaminated by dirt, while, before reaching the customers' hands, it may or may not elude the cream-separator and the water-tap. Even after having been retailed it runs the risk of domestic contamination by flies and dust. Small wonder that the experience of a large city like Liverpool goes to show that 300 out of every thousand artificially fed babies under three months die of summer diarrhoea, as compared with 20 out of every thousand that are breast-fed.

Other important general factors in producing deterioration are want of fresh air and lack of exercise, neither of which is unfamiliar in the life of the town-bred child. A still more important factor, however, is want of cleanliness. I shall refer later to insanitation, and here would explain that by cleanliness I do not imply merely keeping the surface of the body clean, but in addition keeping clean the orifices of the body, especially the mouth and nose. This latter care is hardly the less important of the two, if disease is to be prevented, since the relatively tough skin is a better protection against para-

sitic bacteria than are the delicate membranes lining the mouth and nose, which moreover, being warm and moist, are eminently favorable to bacterial life. Yet how many mothers realize the importance, if colds in the head, sore throats and adenoids are to be prevented, of cleaning away with pledgets of wool the secretions that accumulate far back in the recesses of the nose in infants too young to use a handkerchief? Or the vital importance of keeping the teeth scrupulously clean, as the best and only preventive of dental caries? Perhaps these may sound small points, but it is the small things that count, and I am only stating the A B C of infant hygiene when I say that, with clean noses and clean mouths, physical deterioration with its accompanying ill-health and even worse would be materially reduced in the first five years of life. For adenoids and enlarged tonsils are not merely evils in themselves, but are the regular starting points of further troubles —deafness, discharging ears, dull-wittedness, deformities of the chest, meningitis, abscess of the brain, rheumatism and heart disease. Similarly, decayed teeth not only promote the growth of adenoids and enlarged tonsils, but open the door to tuberculous glands of the neck, anaemia, chronic indigestion and blood poisoning.

III.

It will be agreed that an infant encounters the earliest and most of the greatest dangers to his life within the four walls of his home. That the house, therefore, should be sanitary within, provided with ample air-space, a convenient supply of water, closet accommodation and cupboards for the clean storage of food; that its immediate surroundings should be sanitary, without the privy-middens, refuse heaps and unpaved yards from which disease-bearing flies and dirt are brought into the dwelling rooms; and that the food coming to the house, particularly cow's milk, should be clean, unadulterated and health-sustaining: these are all essentials of healthy infancy. Further, at no great distance should be trees and grass to freshen the air, give color and brightness to the neighborhood and incite to exercise and play.

Even this bare enumeration is enough to show that infant welfare is largely one aspect of the general social welfare. After all, children cannot but accept the parental environment, and as the standard of this is raised the average of infant health will be correspondingly improved. At the same time, however, it is not to be assumed that modern housing, up-to-date drainage, and enlightened town-planning will do all that is needed. They will effect a very great deal, but there still remains another factor hardly less important than all these put together. The mother is a mighty influence for good or evil. If she is enlightened she can turn these advantages to her children's benefits; but she can also fail to make the best use of them; and, worse still, she can neglect them until they actually grow to the danger of her children's health. A dirty living room, personal uncleanliness, improper food, and feeding utensils exposed to domestic contamination can soon destroy the health of a child even in a model house in a garden city. Therefore it is to the mother, her well-being, care and education, that we must look if her children are to be kept healthy. The maternal instinct, so often a thrice-blessed cloak for ignorance, though no doubt the best that Nature can offer for the progeny of animals, does not by itself satisfy civilized requirements. As a motive force it is indispensable, but it is a blind and unreasoning guide impelling mothers every day to acts of omission or commission which operate to the detriment, even to the fatal harm of their children. Yet the difficulty in so many cases, whatever the social class, is to induce a mother to question the infallibility of the instinct, to place herself outside her own feelings where she is free to distinguish the wish from the deed and its consequences.

I know no better way of effecting this than by ensuring that the facts of infant health are already impressed on her mind when the maternal instinct is first awakened. Only by teaching adolescent girls the rules and methods of infant rearing can the welfare of their future children be assured. These rules, once they are known, are so extraordinarily simple, and the least infraction of them carries so heavy a penalty, that, [illegible] the

proper time and in the proper way, they can hardly be forgotten; and the emotions of maternity can only make them the more carefully heeded. Therefore, I submit that no reform is more pressing than the practical training of girls in their responsibilities as mothers

It is necessary to add that it would be too foolish to attempt to train them, as has been suggested, by puting them to handle dolls? Yet where is the educational supply of live babies to be obtained? Whatever the coming improvement in the economic position of women, mothers will still have other duties than the immediate care of infants: there will be the general housework, the shop and industrial employment; and the hardships of children whose mothers go out to work have long been calling for redress. What then is to be done with infants when their mothers are engaged at work? These cases are so numerous in every district as to be satisfactorily dealt with only by collecting them in special day nurseries under the care of a staff of trained workers, a solution which offers the opportunity to obtain a supply of babies for the practical training of the older schoolgirls. Elementary schools are scattered over every district, being the more closely set the denser the population. If, therefore, day nurseries were opened close by the schools they would be within easy reach of the women workers of the district, and at the same time would be conveniently placed for the training of the senior girls in the adjoining schools.

This practical training, while relieving the present education of girls of the grave reproach that whatever else they are taught they learn nothing of the rearing of children, will also be the surest and quickest way to raise a standard of maternal public opinion which will make the existing conditions intolerable to the mothers themselves. But we must not expect it to produce a generation of maternal experts in infant hygiene. The average mother is never likely to be able to detect those earliest signs of disease which are most important from the point of view of cure, still less to apply to the individual child those general principles of prevention which alone can ensure its health. Yet now that the need of prevention or early cure is admitted, and with medical science in a position to supply this need in all but a small minority of cases, the time is ripe to organize medical services in the interests of the oncoming generation before as well as after birth.

It is, as we have seen, during the period before the child goes to school that the seeds of physical deterioration are sown which later grow into the ugly shapes of actual disease. While, therefore, it may be safely assumed that the dangers of this period will shrink to much smaller proportions when young mothers have already been taught as schoolgirls how to avoid them, nevertheless, since special medical advice is essential, children cannot be expected to arrive at schol age physically sound unless they have had the advantage of medical supervision throughout their earliest years. Medical inspection centres, therefore, are needed—comparable to those already known as infants' consultations, though not restricting their interest to babies under one year—where mothers can bring their children not so much to obtain facilities for the treatment of their defects (though provision for this must not be omitted) as to receive advice on preserving their health.

Schools of Infant Hygiene, Day Nurseries, and Medical Inspection Centres for both mothers and children are the chief items in the task now immediately ahead of us. The question of their organization and administration I must leave to those who have a better title than myself to speak on this aspect of the subject. Only this I would venture to suggest. These three organizations are very intimately related to each other. The Centres must necessarily be under medical control, and the Nurseries, with their collections of infants, highly susceptible to infectious diseases, could not be left without the same supervision. Further, all three would be dealing at the same time with the same mothers, the same children, and the same homes. It would seem, therefore, only desirable that nothing should be done to keep them altogether dissociated. On the contrary, having regard to both efficiency and economy, the best results could not be obtained without a fairly close working union between them. Finally, the work can be carried out successfully only

with the mediation of health visitors going in and out of the homes, partly to ensure that the medical instructions are carried out and partly to discover and help remedy any shortcomings which are detrimental to the children's wellbeing. I attach great importance to this side of the work since it can effect a great deal by way of introducing or maintaining in the home the standards and methods of the centres and nursery schools. In other words, I should like the homes of the children to be regarded as integral parts of any future developments, like so many local branches of the headquarters of the organization for the neighborhood.

IV.

It is in some such direction as this that the future improvements in the conditions of infancy seem to me destined to advance, and, I believe, to advance more rapidly in our generation than in any preceding it. The goal is the physical well-being of the children of the nation. A sufficiently inspiring aim which is in no way belittled if a doubt rises to the mind as to its finality. Why this attack on physical deterioration? Is bodily health alone worth striving for except as a stage to a further end? For a foal or a calf it is enough that it should grow into a healthy animal, but a child has a higher destiny. Without physical health his mind, temperament and individuality are liable to be warped and stunted, and only when the body is healthy has the individual the best chance of developing his nature. It is, surely, because of this that the prevention of physical deterioration establishes its claim on the best efforts of humanity.

And yet no great prophetic insight is needed to forcast that, as this vast amount of physical deterioration is gradually eliminated, there will be exposed to view an amount of preventable psychical deterioration every whit as widespread and deplorable, though at present, with but grudging interest given to the medical problems of the mind, it is almost entirely overlooked. But just as we have now learned to trace much of the physical ill-health of adults to the ignorant and wrongful treatment of their bodies in early childhood, so it will, I believe, be realized in course of time that, with the very large number of men and women who suffer from "nerves"—worries, anxieties, fears, self-depreciation and self-mistrust—their physical ill-health takes root in the earliest years of life when their fathers and mothers, knowing nothing of the prevention and early cure of psychical disorders, misused the impressionable emotions of their children with an ignorance profounder even than that with which many parents now regard the simple needs of their bodies.

FLIES AND REFUSE HEAPS

By W. H. Symons, M.D., D.P.H., F.I.C. Medical Officer of Health, City of Bath.

IN BATH for some years past we have distributed leaflets in the more crowded districts drawing attention to the danger from flies, and advising the early removal of refuse and the protection of food from contamination. Last year, in addition to posters and leaflets, I had a shop window placed at my disposal by the Women's Patriotic Club for the exhibition of posters, leaflets, and such other objects as I thought would be useful in preventing infant mortality, and in the month of May I started an exhibition on the same lines as that which was being started at the London Zoological Gardens under the direction of Professor H. Maxwell Lefroy, who called attention to borax as giving the most satisfactory results in fly prevention. Small amounts, such as 1¼ lbs. per eight bushels of manure destroyed 98 to 99 per cent. of the maggots, and he stated that borax kills the eggs as well as the larvae—0.62 lb. of borax in 2½ gallons of water per eight bushels, or 1 oz. of borax per cubic foot of manure.

The experiments upon which this statement was made were probably those recorded in a bulletin of the United States Department of Agriculture, No. 118, July 14th, 1914. The work appears to have been most carefully done under the direction of a professor of physiological chem-

*Abstract of a paper read at Provincial Sessional Meeting of the oyal Sanitary Institute, April 15th, 1916.

istry, an entomologist, and a mycologist. Experiments were tried with kerosene, kanut (KCl. Mg SO_4), pyroligenous acid, iron sulphate, carbolic acid, table salt, copper sulphate, lime sulphur mixture, potassium cyanide, Paris green, formaldehyde, sodium flouride, ammoniacal gas liquor, and calcium cyanide, but the most favorable results were obtained by the use of borax, which shows a larvicidal power of over 99 per cent. in nearly all trials. The experiments were started on September 13th, 1913, and examined for pupa on September 25th and October 6th. The results of these experiments and other scientific evidence were also published in a book issued by the Borax Consolidated, Ltd., under the title of Fighting the Fly Peril. I am also told by others that borax has been found most useful, but my own experiments with blow-flies and with the common house-fly have been most disappointing. As used by me in a saturated solution, i.e., half a pound to a gallon of water, borax does not seem to injuriously affect either the eggs or the larvae of the fly. I shall be glad to have the evidence of others, but I well remember borax being recommended as a means of exterminating the cockroach, an insect which is known to have dominated the insect world in the paleozoic period a million years ago. Many persons failed to obtain satisfactory results, and one person suggested that success depended upon pressing that aristocrat between two lumps of borax.

In my first experiments a weighted quantity of 25 lbs. of horse manure and straw litter was placed in each of three heaps on June 17th, the ground for one heap being prepared with 2 lbs. of powdered borax, two others were prepared with 2 lbs. of crude ammonium sulphate, and the fourth was a larger control heap on macadamized soil. Weighed quantities of 25 lbs. of manure were added to each heap every day or two. On one, a half gallon of saturated solution of borax was sprinkled; on the second, a pound of ammonium sulphate dissolved in half a gallon of water; on the third, one pound of dry ammonia sulphate was sifted; and on the fourth plain water was added in similar quantity. There were five lots added during the end of June and the beginning of July. These heaps were all under a lean-to roof near the public road, and adjoining the Bath Gas Works. Three heaps were, when finished, less than one cubic yard in extent; the control heap was larger. They were separated by stone buttresses, and were against walls facing east and south and shaded by buildings.

A thermometer was placed in a tube and passed down nearly to the bottom of each heap and kept there. I paid four or five visits a week and personally saw the lots of manure weighed and placed in position and noted the temperatures. There was not much variation between the temperatures of the heaps—the temperature at no time rose above 70 deg. C. (158 F.). The air temperature varied from 42.8 deg. to 75.3 deg. F., and the rainfall each week was 1.11, .73, .92, 1.84, .43, .89, 1.50, .08, .00 inch. I left them quiescent during August while I was away and had them turned over on September 1st, but could find no evidence of flies and no offensive odor, even after keeping samples a week in covered tins. The control heap was permeated by the mycelium of a mould, and superficially there were a good many cobwebs in all the heaps.

Thinking that possibly the vicinity of the gas works and a recently tarred road may have been obnoxious to the flies, I determined to repeat the experiments in my own garden, which is in the comparatively open country. The ground chosen was 170 feet above the sea level, on a plot of ground naturally sloping slightly eastward on the blue lias formation, but fairly level on the north, west and south. Above the rock on this plot of land there was a depth of 18 inches of Midford sand, which had been brought from the outcrop of this formation in south-east Bath, and above the sand a foot of loam and grass natural to Combe Park. This plot formed a portion of a tennis court prepared in 1905, and 260 feet from the public road. On Monday, September 13th, one ton of horse manure, which had been dropped during the preceding 36 hours, was brought from the corporation stables. Mechanical analysis showed that the manure contained about 25 per cent. of small straw, and on sun-drying in a glass-house it lost 52 per cent. of its weight. A mixed sample of 88 ounces was used for this analysis.

A large colony of flies accompanied the manure; most of them were the common

house-fly. The manure was carried from the cart in baskets, each lot being weighed and placed in one of four heaps. Three receptacles were formed of corrugated iron sheeting, the ground being first covered by half-inch mesh wire netting; but one heap was made in the open against a wall which protected it on the north.

Two experimental heaps were prepared, one with ammonium sulphate, the other with borax. For the first, one pound of dry ammonium sulphate was distributed over the ground from a sieve, and then 70 pounds of manure on which was sprinkled a solution of one pound of ammonium sulphate in half a gallon of water. Eight lots of manure were added in this way, making a heap of about 12 cubic feet; five cwt. of manure with ten pounds of ammonium sulphate, one pound being sifted over the top, and four gallons of water. The borax heap was prepared in the same way, but with a gallon of a saturated solution of borax added to each lot: a total of six pounds of borax and eight gallons of water to five cwt. of manure. This is about eight times the quantity of borax recommended for use by the Borax Consolidated Company, Limited.

A compo pipe was pushed into each heap, allowing the thermometer to rest about the middle of the heap, and a similar thermometer was suspended in the open air close by. The temperature of each heap was observed and noted two or three times a day the first few days, and almost daily up to November 16th, and at intervals after that. The usual meteorological readings were also taken in a Stevenson screen, and over and under the ground close to the heap—these readings are very similar to those which are taken in Central Bath and published in my annual report.

The temperature of the covered control was, at 1 p.m. on the 13th, 47 deg. C. At 7 p.m. it had risen to 70 deg. C., and kept near that temperature for 48 hours, but on the 16th the temperature was falling all day, and on the 17th was 55 deg. C.; on the 19th, 37 deg. C.; 20th, 29 deg., and on the 21st, 21 deg., or only three degrees above the external air. No higher temperature was registered until October 16th, when a secondary fermentation began, the temperature rose to 25 deg., going up to 28 deg. on the 29th, after that gradually falling to normal, which condition has been maintained. I have mentioned these temperatures somewhat in detail, because at a recent sessional meeting of the Royal Sanitary Institute one observer said he had seen heaps so heated as to be charred. In that case it must have been due to chemical action, while the temperatures I noted, being strictly limited to 70 deg., were due to bacterial fermentation; all insect life would be killed at 60 deg. C. (140 deg. F.). The rise of temperature was retarded in the other heaps probably owing to the presence of water, but on the third day all the heaps showed a temperature of 69 deg. or 70 deg. C. (158 deg. F.), after which the fall was gradual, and no secondary fermentation took place except in the covered control heap.

Mappin & Webb's fly-traps were placed in each heap, but the greatest number of flies caught after the first few days was five on September 27th, and three on September 30th; these were all the common house-fly. One fly was caught on October 5th, but after this date the heaps were forsaken.

Personally, I think there is little danger from a well-packed manure heap if it is not near milk or other food, but I do not think it wise to recommend the use of an open dustbin with recent food remnants for trapping flies, as advocated by C. Hurdstone Hardy in a lecture delivered at the congress of the South-Eastern Union of Scientific Societies at Brighton on July 4th last. The idea is scientifically correct, but could Mary Jane be relied upon to carry out her share in the experiment, and are we English so altruistically inclined as to always bear in mind our duties to our neighbors Might not the open dustbin be forgotten when rushing away for the August holiday? What a fine time the flies would have in visiting the residences of those who preferred September to August for holiday keeping.

Where manure is loosely packed and exposed to weather on the roof of a shed or in a yard, so that it may be partially freed from filth and used again in the stable, there is great danger to the public, and yet this practice is permitted in some towns, and you may see the manure so ex-

posed as you pass along public thoroughfares.

In a properly policed town a well-kept mews is generally free from flies. Motor cars are frequently kept near stables, and the odor of petrol is enough to keep the fastidious fly away. I had some difficulty in getting house-flies last year. The stable-fly, the green bottle blow-fly, and the lesser house-fly were common enough, but the domestic house-fly, which loves to travel to and fro from dung-heap to the dining room, was very scarce until August.

Incidentally I may say that it is quite easy to distinguish the ornamental, harmless fly from the deadly typhoid fly. The crucial test is, of course, the nervation of the wings, particularly observing that nervure which rejoices in the name "medio-cubital longitudinal nervure"; but for ordinary purposes it is sufficient to note the pose of the fly when at rest, the lesser house-fly folds her wings so that they overlap, the domestic house-fly keeps hers slightly inclined outwards. Then as regards sex; the male fly looks straight forward and his eyes are placed close together, while the female has a sly glance on both sides and her eyes are somewhat wide apart. The maggots of the house-fly are smooth; those of the lesser fly are more like a caterpillar with bristles.

In the present summer I think we should specially watch the tips of road sweepings. In past years these have commanded a ready sale, as they are rich in horse dung, but now the sweepings from main roads contain tar, and are unsuitable for gardens. The sweepings from the meaner streets contain no tar, but they may be rich in manure and in vegetable refuse. Separate heaps are kept at the tips, and the fly has a very great choice of climate; one portion of the tip may be actually in flames while another portion is covered with snow. The ideal way of disposing of road sweepings is by cremation at the destructor, and I am informed that this is actually done in some towns, but it must tax the capacity of the cells and add greatly to the labor and cost.

It seems scarcely necessary to completely burn road sweepings. It would, I think, be sufficient to char them, and I have thought that this might perhaps be done on a moving platform, travelling round in a vertical plane in the flue chamber of the destructor, and carrying the sweepings behind the cells, and throwing them off at the base of the main upshaft; but the fumes from the road sweepings would have to be completely burnt before passing into the shaft. I hope that engineers will give some attention to this problem. There is room for improvement in our methods of collecting house refuse. I shall not be satisfied until I see covered receptacles used for conveyance from the back yard to the destructor.

In considering the question of nuisances arising from refuse heaps too much importance is attached to what is called the direction of the prevailing wind. One has only to stand at the corner of the street for a short time and watch the smoke of various chimneys to see that the wind bloweth where it listeth, so it is very difficult to say where it comes from and where it goes; only the smoke from a tall chimney at least a hundred feet above the roadway can give any true idea of the direction of the wind, and this may be misleading as regards the properties of the wind. In considering climates, I use the absolute direction of the wind as determined from barometric observations by Buy's Ballots Law. Stand with the lower barometer on your left the wind will be going forward. But in considering nuisances, one has to pay attention to wind drift, not to wind direction at higher level. The direction of the wind at surface levels is determined by temperature; the cold air travels along the water courses and lies about in the valleys. The readings of grass thermometers are indications of this fact. With the cold air will also travel particles from refuse heaps, etc., and ultra-microscopic particles from refuse heaps, etc., and ultra-microscopic particles have an important bearing on disease. Personally I am inclined to regard the bacillus merely as the carrier of ultra-microscopic particles, and not as the prime factor in physiological action.

PROGRAM OF THE 5TH ANNUAL CONGRESS OF THE CANADIAN PUBLIC HEALTH ASSOCIATION

Quebec City—Sept. 13th and 14th, 1916.

Wednesday, Sept. 13th—City Hall.

10 a.m.—Registration of members.

11 a.m.—General business meeting; Report of Secretary; appointment of Committees.

12-15 p.m.—Departure from Quebec and Montmorency Ry. for lunch at Montmorency Falls.

Afternoon Session—City Hall.

2 p.m.—

1. Social investigations in relation to Public Health, Madame Gerin-La joie, Presidente, Federation Nationale Saint Jean Baptiste, Montreal.
2. The returned soldier and his problem—Dr. Thompson, M.P., Yukon Territory, Medical Superintendent, Military Hospitals Commission.
3. Modern sanitation in camps—Dr. J. W. S. McCullough, Medical Health Officer for Ontario, Toronto.
4. Improvement of milk supplies in small towns—Dr. John Hayes, Vice-President Sanitary Services, Province of Quebec, Richmond, P.Q.
5. Pollution of drinking water by untreated sewerage. M. Moc H. McCrady, Chemist, Quebec Provincial Board of Health.
6. Meat inspection—Dr. A. J. Hood, Chief, Department of Food Inspection, Montreal.
7. Notification of venereal diseases — Dr. P. V. Faucher, Professor, Laval University, Quebec.

Evening Session—Promotion Hall, Laval University.

8 p.m.—

1. Address of Welcome—H. E. Lavigueur, Esq., Mayor of Quebec.
2. Address by Sir Lomer Gouin, Premier Province of Quebec.
3. Address of President Canadian Public Health Association—Chas. J. Hastings, M.D., Medical Health Officer, Toronto.
4. A Federal Department of Health, by Michael Steele, M.P., South Perth, Ont.
5. De l'influence de la bacteriologie sur les developpements de l'hygiene moderne—Docteur Arthur Vallee, Professor a l'Universite Laval, Quebec.

Thursday, Sept. 14th—City Hall.

Morning Session—Symposium on Immigration.

9.30 a.m.—

1. Insanity and feeble-mindedness in immigrants—C. P. Clarke, M.D., Superintendent Toronto General Hospital, Dean Faculty of Medicine, Toronto University.
   Discussion: Dr. W. H. Hattie, Provincial Health Officer, Nova Scotia.
   Dr. Helen MacMurchy, Inspector of Auxiliary Classes of Ontario, Asst. Inspector of Asylums and Jails.
   Dr. G. S. Mundie, Faculty of Medicine, McGill University, Montreal.
2. Effectiveness of methods of inspection of Immigrants—Dr. J. D. Page, Chief Medical Officer, Port of Quebec.
   Discussion: Dr. P. H. Bryce, Chief Medical Officer, Department of the Interior, Ottawa.
   Dr. F. Montizambert, C.M.G., Director-General of Public Health, Ottawa.
3. Conserving the immigrants' resources —J. S. Woodsworth, Esq., Director, Bureau of Social Research, Governments of Manitoba, Saskatchewan and Alberta.
4. Civic problems caused by the immigrant—J. W. Shaver, Fort William, Ont.
5. The foreign immigrant as a Canadian citizen—M. M. Seymour, Commissioner of Health, Saskatchewan.

6. Title to be given later—Mrs. Burrington Ham, National Secretary Travellers' Aid and Immigration Committee of the Y.W.C.A., Quebec.
7. The tubercular immigrant in Canadian sanatoria—Dr. C. H. Laurin, House Surgeon, Immigration Hospital, Quebec.

Afternoon Session—City Hall.

2 p.m.—

1. Activated sludge treatment of sewage—H. W. Clarke, Chemist, Lawrence Experiment Station, Boston, Mass.
2. Modern conception of fumigation after communicable diseases—F. Adams, M.D., Acting Director of Laboratories, Department of Health, Toronto.
3. Difficulties of providing adequate water supplies for small and large towns—Dr. C. R. Paquin, Medical Health Officer, Quebec City.
4. Pre-natal care of mother—Dr. Jos. Gosselin, Asst. Medical Health Officer, Quebec City.
5. Value of milk depots (Gouttes de lait)—Madame Jules Tessier, Quebec.
6. Hygiene of children before school age—Dr. Rene Fortier, Professor, Laval University, Quebec.
7. Serum therapy—Professor Fitzgerald, Director Hygienic Laboratory, Toronto, and Dr. Defries, Provincial Health Laboratory, Ontario.

5 p.m.—

Business meeting—Election of officers.

Evening Session—City Hall.

8 p.m.—

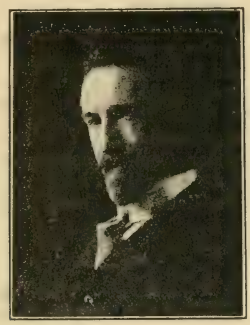
1. Carriers of disease—Sir James Grant, K.C.M.G., Ottawa.
2. Economic value of preventive medicine—Ex-Controller McCarthy, Toronto.
3. Importance de l'Hygiene dans l'administration municipale—Dr. J. A. Beaudoin, Medicin Municipal, Lachine, P.Q.
4. The housing problem—Municipal records of house to house inspection—Dr. Emile Nadeau, Asst. Medical Supt. Immigration Hospital, Quebec.

Friday, Sept. 15th.

Excursion to Saguenay, with call at Grosse-Isle, Quarantine Station.

CANADIAN POETS

XXIX



ALAN SULLIVAN

The charm of his lucid and melodious verse has attracted wide and deep attention in Canada and the United States. A few of the titles are these: 'The Lover', 'Respice', 'To Sleep', 'Suppliant', 'When in the Speechless Night', 'The Call', and 'Came Those who saw and Loved Her' which is perhaps the poet's greatest achievement. In this poem he has reached a magnificent level. . . . . The apotheosis of honest toil is a golden thread running through much of Alan Sullivan's work. It is the dominant feature of his remarkable poem, 'The City.' . . . . It is the same attitude towards brawn and sinew which we find in his prose sketches, 'The Pilots of the Night,' and 'The Essence of Man.' . . . . He is always paying homage to the native and naked dignity of man. . . . While he is not in the usual sense a didactic author, he exhibits in his prose work and occasionally in his poetry, some characteristics of the social and moral philosopher.—J. E. Wetherell, B.A., in 'MacLean's Magazine.'

ALAN SULLIVAN has long had recognition in the United States, through his poems, short stories, and comprehensive articles on various themes, which have frequently appeared in Harper's Magazine, The Atlantic Monthly, and other leading American periodicals; but Canadians are only beginning, it seems to me, to realize his literary genius and fine workmanship. Recently I have read with critical interest most of his output, and am deeply impressed by his keenness of perception, his intellectual grasp, his power of sustained analysis, and by his native sense of the fitness of things. He is not only a poet of distinction, he is a writer of fiction of unusual excellence.

Edward Alan Sullivan was born in St. George's Rectory, Montreal, November 29th, 1868. He is the eldest son of the

late Bishop of Algoma, the Right Reverend Edward Sullivan, who was of Irish birth, and Frances Mary Renaud, a native of Scotland. In 1869, his father became Rector of Trinity Church, Chicago, and the family was resident there during the terrible conflagration which devastated that city in 1871. In his fifteenth year, he was sent to Loretto, a famous school for boys, in Musselburgh, Scotland, where he remained until his course of studies was completed. On his return to Canada, he attended the School of Practical Science, Toronto, and then engaged in railway exploration work in the West, and later in mining. He was assistant engineer in the Clergue enterprises at Sault Ste. Marie for a year and a half, before the organization of the Consolidated Lake Superior Company. Subsequently, he spent several years as a mining engineer in the Lake of the Woods district, during the period of its gold exploitation.

In December, 1900, Mr. Sullivan married Bessie Salisbury, daughter of Mr. George H. Hees, of Toronto, and their happy and beautiful home in Wychwood Park, Toronto, is now graced with four bright children, two boys and two girls.

In 1903, he became Mechanical Superintendent of Gutta Percha and Rubber, Limited, and held the position for ten years. He is now allied with a large number of Canadian electric light and power companies, and also devotes himself more fully to literary effort.

The following are his most important book publications:—*I Believe That,* 1912; *The Passing of Out—I—But and Other Tales,* 1913; and *Blantyre: Alien,* 1914.

SUPPLIANT

Grant me, dear Lord, the alchemy of toil,
Clean days of labour, dreamless nights of rest,
And that which shall my weariness assoil,
The sanctuary of one beloved breast:

Laughter of children, hope and thankful tears,
Knowledge to yield, with valour to defend,
A faith immutable, and stedfast years
That move unvexed to their mysterious end.

PROSPICE

The ancient and the lovely land
Is sown with death; across the plain
Ungarnered now the orchards stand,
The Maxim nestles in the grain,
The shrapnel spreads a stinging flail
Where pallid nuns the cloister trod,
The airship spills her leaden hail;
But—after all the battles—God.

Athwart the vineyard's ordered banks,
Silent the red rent forms recline,
And from their stark and speechless ranks
There flows a richer, ruddier wine;
While down the lane and through the wall
The victors writhe upon the sod,
Nor heed the onward bugle call;
But—after all the bugles—God.

By night the blazing cities flare
Like mushroom torches in the sky;
The rocking ramparts tremble ere
The sullen cannon boom reply,
And shattered is the temple spire,
The vestment trampled on the clod,
And every altar black with fire;
But—after all the altars—God.

And all the prizes we have won
Are buried in a deadly dust;
The things we set our hearts upon
Beneath the stricken earth are thrust;
Again the Savage greets the sun,
Again his feet, with fury shod,
Across a world in anguish run;
But—after all the anguish—God.

The grim campaign, the gun, the sword,
The quick volcano from the sea,
The honor that reveres the word,
The sacrifice, the agony—
These be our heritage and pride,
Till the last despot kiss the rod,
And, with man's freedom purified,
We mark—behind our triumph—God.

THE KITE

Upon the liquid tide of air
It swayed beside a dappled cloud;
It seemd athwart the sun to fare
Full of strong flight, as though endowed
With vibrant life. Buoyed in the sky
It swam, and hardly might the eye
Traverse the fields of ambient light
To scan its heaven aspiring height.
And, like a spider's web, there slipped
A pulsing earthward thread, that dipped
In tenuous line, that throbbed and spoke,
Down through the sunlight and the smoke
Down to a small and blackened brood
Of puny city waifs that stood,
And—lost to hunger, want or time—
Stared, rigid, through the city's grime
At the far envoy they had given
As hostage to the winds of heaven.

Thus may the Soul to heights elysian
Send argosies of dream and vision;
Send far flung messengers that rise
Strong pinioned, cleaving to the skies,
To float amid the poised spheres,
Beyond the tumult of the years,
Till—down the rare and rainbow line
That earthward trails from fields divine—
Shall pulse the throb of mystic wings
And faint, sweet, rapturous whisperings
Of incommunicable things.

CAME THOSE WHO SAW AND LOVED HER

Came those who saw and loved her,
She was so fair to see!
No whit their homage moved her,
So proud she was, so free;
But, ah, her soul was turning
With strange and mystic yearning,
With some divine discerning,
Beyond them all—to me:

As light to lids that quiver
Throughout a night forlorn,
She came—a royal giver—
My temple to adorn;
And my soul rose to meet her,
To welcome her, to greet her,
To name, proclaim, her sweeter
And dearer than the morn:

For her most rare devising
Was mixed no common clay,
Nor earthly form, disguising
Its frailty for a day;
But sun and shadow blended,
And fire and love descended
In one creation splendid
Nor less superb than they:

. . . . .

You—of the finer moulding,
You—of the clearer light,
Whose spirit life, unfolding,
Illumed my spirit's night,
Stoop not to end my dreaming,
To stain the vision gleaming,
Or mar that glory, seeming
Too high for touch or sight.

Dear as the viewless portal
Of dream embroidered sleep,
Lift me to dreams immortal,
Till, purified, I leap
To hear the distant thunder
Of dark veils rent asunder,
And lose myself in wonder
At mysteries so deep.

Till, past the sombre meadows,
Tearless and unafraid,
Linked even in the shadows,
Our deathless souls have strayed;
And you, my soul's defender,
O valiant one and tender,
Cry out to God's own splendour,
Behold the man I made!

THE CITY

Day leaped over the city wall
With one quick, sharp imperative call,
And, at the luminous touch of him,
The glow of a myriad lamps grew dim.
Life, like a question, seemed to creep
Where the shadows gathered black and deep,
Till, in the hush of the morning air,
Came the sigh of a multitude hidden there.
Then movement and murmur borne afar,
The grinding wheels of a hastening car,
And, sudden, the tide of humanity flowed
By lane and valley, by square and road
With the dogged hard inflexible tread
Of men that sweat for their daily bread.

The dusty city engulfed them all
That came at her fierce relentless call;
The shining engines trembled and stirred,
A thousand factories opened wide,
The lips of the lifting steam valves purred,
A thousand diligent wheels replied;
So jar and effort and clamor grew,
And toil that only the toiler knew.

The stream had slackened, but rose again
Fringed with a lesser breed of men,
Narrow shouldered and pale of face,
Soft-handed sons of a softened race,
Brushed and scented and combed and pressed,
Decked like the windows they daily dressed;
Children, old ere their childhood came,
Bent, to some hardened master's shame,
Robbed of the vision of childish mirth,
But wise from the sharing of work and dearth;
Youthful lawyers with anxious looks
Swinging bags and portentous books;
Last of all, in luxurious ease,
Trim stenographers, salesmen, clerks.
Bankers and brokers, and such as these,
In opulent motors that swiftly pass
With a flash of panels and polished glass.

The reeking city had room for all
Who came at her hard and dominant call,
Till the voice of her labor sounds aloud
Till streets are black with a turbulent crowd;
Crush and hurry and press and race
Till courtesy covers her burning face;
The battle is on—with brain and will,
The battle is on for the dollar bill;
The gods of the nation have turned to gold
And honor and love are bought and sold:
The gambler smiles as he juggles with fate,
And the greater is he whose gain is great;
The merchant smiles o'er the counter rails
At the profit he makes on his bargain sales;
The lawyer smiles, pleads a burglar off,
Forecloses a mortgage—and—goes to golf;
The banker smiles and the smile is wide
At the figures that show on the surplus side;
Wherever the smiles may come, they still
Are mostly based on the dollar bill.
The rich man wastes what the beggar needs,
The miser scowls while the widow pleads,
And little children with tender feet
Dodge death for pence in the roaring street.

The sun loomed large in the dusty air,
And tempered the fire of his noontide glare;
The voice of the clamorous whistles spoke,
And a hundred thousand toilers broke
From forge and factory; men forsook
Bench and counter, column and book
Till flagstones rang with the homeward tread
Of those that sweat for their daily bread.
Bent broad shoulders and tired eyes,
Blackened faces and weary hands,
Dull of hearing, but very wise
To mark necessity's stern commands:
Laborers all—but every one
Made in the image of God's dear Son.

Silence and echoes and lines of light,
Threading the quiet deserted street;
Empty buildings, and, then the height
Where changeless heaven and starlight meet;
The peace of darkness for laboring men,
And rest ere cometh their toil again,
For night crept over the city wall
And blessed sleep enveloped them all.

The Sanitary Inspectors' Association of Western Canada

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THE NECESSITY FOR FOOD INSPECTION

Read Before the Winnipeg Members by G. R. Mines, Associate R. San. Inst., Food Inspector, Winnipeg Health De- partment.

IN THESE DAYS of advanced sanitary knowledge but few people will be found to deny that food inspection is necessary, although we sometimes come across the old-fashioned individual who claims that people were just as healthy when there was no inspection. It is not possible to prove the contrary by actual statistics, because proof that disease in man is caused by eating the flesh of animals suffering from that disease is difficult to procure. For instance, in the case of a man developing tuberculosis, he may have contracted the disease by inhalation, by accidental inoculation with infectious material, or by the ingestion of tubercular milk or meat; then, again, a person may eat diseased meat and not be aware of it, and the disease may not develop for some little time, when it is not possible to trace the connection. It must also be admitted that large quantities of diseased meat have been eaten without harm, so far as is known; so that in just what relation the consumption of diseased meat stands as regards injury to health is not known. On the other hand we know that there are authentic cases of transmission of disease through meat. In Germany, in the year 1890, 109 people contracted anthrax through eating meat from animals affected with that disease, and 14 of these people died; in 1900 there were 62 cases with 10 fatalities. There are numerous cases on record of trichinosis caused through eating affected pork; one outbreak at Hettestadt caused 129 deaths out of 500 cases. There are also authentic cases of the cysticercus disease in man caused by eating pork infected with cysticercus cellulosae. Bollinger gathered data with regard to 40 outbreaks of meat poisoning, caused by eating meat of animals that underwent emergency slaughter, owing to disease or parturition, and in some cases veal from calves suffering from septic affections.

So we see that the possibility of transmission of disease by meat does exist. We also know that where systematic inspection is enforced there are but few cases of animal diseases occurring in man. In Germany, where so much raw and half-cooked pork is eaten, the cysticercus disease is almost unknown compared with fifty years ago, and as compared with countries where there is no inspection, such as Russia, Galicia and Roumania. By inspection, large quantities of diseased meat are every year removed from the market and destroyed, which otherwise would be consumed by the public, so that the inspection of meat must have a considerable effect on the health of a community. The chief aim of sanitary science is the prevention of disease, and surely the elimination of diseased food is a great step towards the fulfilment of that aim. Hygiene is not a new science by any means. Writings on health are among the oldest in the world, for the subject has engaged the attention of the profoundest thinkers. The fact that we find, in early history, restrictions placed on the use of certain articles of food, proves that there was a knowledge that harm might result from the consumption of such articles. Herodotus, a Greek historian, who lived 450 years B. C., tells us that the Egyptians were forbidden to eat pork for the reason that it produced an excess of humors and eruptions. The hydatid cyst is mentioned by early medical writers, and Aristotle, the Greek philosopher, speaks of examin-

ing the tongues of pigs to ascertain the presence of bladder worms. The Mosaic law forbade the slaughter of animals affected with wasting diseases and the consumption of unwholesome meat, carrion, or anything that had defects. Animals intended for sacrifice were required to be perfectly healthy, and furthermore they had to be certified by a mark on the horns, and death was the punishment for any priest sacrificing an animal not so certified. The Athenians were forbidden to eat the meat of a lamb which had not been shorn twice, and in early Greek history we find records of a system of market police who were entrusted with the proper conduct of the meat traffic. Mohammed, in the Koran, decreed a series of regulations concerning food materials in which he forbade the use of meat from animals which had died a natural death, or by accidental injury.

Thus we find the necessity for meat inspection recognized in the records of ancient races, and from that time down to the present day numerous laws have been passed regulating the meat and food traffic, and providing penalties for their infraction. Ostertag gives us some interesting information regarding the various German ordinances governing meat traffic, and we must admit that meat inspection in Germany has been brought to a high state of efficiency. The earliest German records in which traffic in meat is mentioned, are the articles of the City of Freiburg, in 1120, and in 1276 the regulations concerning butchers in the Augsburg charter, prescribed slaughter in a public slaughterhouse for cattle and sheep, and compulsory inspection and declaration of diseased meat—a standard of hygiene not reached by many cities today. In the 19th century we find other countries passing laws governing the meat and food traffic, but compulsory inspection in most cases only applies to meat intended for export trade.

Meat is the most important, as well as the most difficult, part of food inspection. The flesh of animals forms a large part of the food of most people, and yet the general public show considerable ignorance as to the wholesomeness of the meat they buy; not only so, but the consumer cannot sufficiently protect himself by private means, for there is no definite method of preparation by which the unwholesomeness attaching to meat, under certain conditions, may be removed, and reliable criterion as to its fitness for use can only be obtained by inspection. Furthermore, experience has shown that even in cases where it is possible, by observing certain precautions, to avoid the harmful effects of meat, the public is inclined to neglect the precautions. This is illustrated by parasitic diseases, preventable through thorough cooking, and yet the numerous epidemics of trichinosis, etc., have not sufficed to change the custom of eating half-cooked pork. There is also the danger of substitution by unscrupulous dealers of one kind of meat for another, such as horse flesh for beef, and goat flesh for mutton. For these reasons it is the duty of sanitary authorities to withhold from consumption all meat likely to injure health, and to see that the public is not imposed upon.

In this country there is little substitution of meat practised, the sale of horse flesh being forbidden, there is not the danger of its substitution for beef, as there is in European countries where the sale is legal under certain conditions, but our meat supply comes to us through so many different channels, large quantities being killed in abattoirs where there is no system of inspection, that the problem of maintaining a wholesome supply is a large one.

In our own city the large abattoirs have Government inspectors stationed on the premises, but this is mostly in the interests of the export trade, as no meat may be shipped out of the province without the Government certificate. Many animals are slaughtered in small abattoirs outside the city, without inspection, and the meat brought in for sale; and there are a number of butcher stores where the greater part of the meat offered for sale does not bear the Government stamp. In some restaurants uninspected meat is largely used, as cheapness is usually a great consideration, and it is in these cases that municipal inspection steps in and protects the public from consumption of meat that is not fit to be used.

The public has the right to a guarantee that the food supplied to them is pure and

wholesome, and in the case of meat this can only be given by the inspection of animals before and after slaughter. The establishment of public abattoirs, with competent inspectors attached, and compulsory slaughter and inspection in those abattoirs of all animals intended for human food, would greatly simplify the problem of guarding the city's meat supply.

Meat may be injurious to the consumer in several ways; it may be the means by which pathogenic organisms are introduced into the human body, as certain diseases are directly transmissible to man; it may contain the intermediate forms of parasites capable of developing in the human subject, and it may be very dangerous on account of the changes which occur in the flesh, caused by diseases not transmissible to man, or by the action of putrefactive bacteria. It is improbable that any butcher would try to sell meat from an animal which had been killed while in the last stages of disease, as the change in the appearance of the meat is so pronounced that the most ignorant person would hesitate to buy it, but in the earlier stages the change is so slight as to be unnoticeable to the average person, and yet the meat may be as nocuous in the one case as in the other. The early stages of tuberculosis, trichina spiralis, and cysticerci produce little change in the appearance of the flesh and yet if it is eaten under certain conditions it is potent to cause disease in the person eating it. By certain conditions I mean if it is later half-cooked or in some of those preparations in which raw meat is used; for it must be understood that cooking, if carried on long enough at a high temperature, will destroy all pathogenic organisms, but we do not like our meat overdone, and it is seldom that the temperature in the inside of the joint is as great as on the outside. In experiments made by Professor Woodhead for the Royal Commission on Tuberculosis, he injected tuberculous material into the centre joints of meat and cooked them in the ordinary way, and he concluded that while the temperature was sufficient to destroy tubercular material on the outside of the joint it could not be relied upon to render the meat sterile.

Diseased meat may be doctored in some manner in order to hide evidence of disease. Most of us are acquainted with the practice of stripping beef—removing the pleura, or peritoneum, and with it the evidences of tuberculosis, and by this means turning a repulsive looking carcass into one that appears innocent of all harm. Carcasses of animals may be treated with preservatives which hinder decomposition on the outside but do not prevent putrefaction setting in in the deeper parts.

It is not my intention to speak of diseases of animals, but as showing the necessity for inspection it might be as well to notice the number of diseases which affect animals used for human food. The following occur in man as well as in animals: Anthrax, actinomycosis, foot and mouth disease, pox, rabies, tuberculosis. Those occurring in animals only: Pleuropneumonia, rinderpest, black-quarter, swine erysipela, hog cholera, parturient fever, septicaemia and pyaemia. The parasitic diseases, trichina spiralis, the hydatids of Taenia solium, T. echinococcus, T. saginata, and flukes all continue the cycle of their existence in man, and there are many organic diseases, and anomalies of the blood, which may render meat unfit for food, but they are too numerous to mention here. The last Dominion Government Report of the Meat Inspection Service mentions 60 diseases and conditions resulting from disease as the cause for condemnation of meat. 7,177 carcasses of cattle were condemned, of which 2,488, or more than a third, were tubercular, septicaemia accounted for 182, C. bovis 263, and pneumonia 118. In swine tuberculosis was responsible for 2,240 carcasses out of 4,007 condemned, septicaemia for 392, hog cholera 243, pneumonia 268 and C. cellulosae 217. Out of 399 sheep condemned, 66 were for septicaemia and 92 for pneumonia. Portions of other carcasses were condemned and of these by far the greater part was on account of tuberculosis.

By inspection before and after slaughter diseased meat can be kept from the market, but the danger from putrefying meat can only be met by a routine inspection of places where meat is offered for sale, or manufactured into some of the different preparations. Meat may leave

the abattoir perfectly good, but if it is kept under bad conditions, changes soon take place in the tissues, due to putrefactive bacteria, which are present everywhere, and which find a good medium in which to develop. Despite the fact that some people like game and mutton more or less high, all authorities agree that decomposing meat is a highly dangerous food. Our knowledge of food poisoning has increased greatly of recent years. Many cases, previously of mysterious origin, can now be explained by the action of the putrefactive bacteria, and the products they form by splitting up the proteid substances. The food may not show evident signs of putrefaction, and yet, if eaten, may produce symptoms of intestinal irritation, known as ptomaine poisoning.

In 1856 Panum demonstrated that the poison which occurs in putrefying meat is a chemical substance, and not a living organism, although it is formed by organisms, as he was able to boil it for eleven hours, and dry it at boiling heat, without destroying its poisonous properties.

Prepared meats offer to unscrupulous dealers a ready means of using animal flesh of doubtful quality, and if we consider the number of preparations on the market, and the large trade in them, we must admit the possibility of danger to health. Sausage, like charity, covers a multitude of sins, and once it is in its skin, it is difficult to recognize the nature of its contents; even the skin may be the intestine of a diseased animal. Especially is this true amongst the foreign portion of our population, on account of the use of garlic, which has the property of hiding any taint or smell the meat might have.

In some preparations the meat is only partially cooked; in others the blood and viscera are used, and apart from the fact that most diseases affect these parts of the animal, they decompose more quickly than the musculature, therefore it is imperative that they should be from healthy animals.

Under certain conditions other articles of our diet, such as milk, butter and cheese may transmit disease, or be unwholesome through the presence of putrefactive bacteria. Milk is largely used by everyone, and it forms the greater part of the diet of sick people and children; moreover it is used largely in a raw state, and it is highly important that it should be obtained from healthy cows, produced in such a manner as to reduce contamination to the minimum and delivered without addition to it, or abstraction from it.

At least three diseases, anthrax, tuberculosis and foot and mouth disease, are directly transmissible by milk, and it may also be the means by which other diseases, such as typhoid fever, diphtheria, and cholera, which do not affect animals, may be transmitted to man, the milk becoming infected in various ways after withdrawal from the udder. Bacteria of all kinds find milk a splendid medium in which to develop and yet they do not alter the appearance of the milk so that their presence may be detected by a physical examination.

Tuberculosis is the most common disease affecting cattle; it is the most important from a sanitary standpoint in its transmissibility to man by milk. Many instances are on record of cows, which appeared healthy, reacting to the tuberculin test, and, according to Walley, "the tubercle bacillus can be detected, not only in the lactiferous product of animals in whose udders tubercular lesions exist, but occasionally also in that product, when the gland, to all appearance, is perfectly healthy."

There is no doubt that the danger to the public from the ingestion of raw tubercular milk is much greater than that resulting from the consumption of imperfectly cooked tubercular meat. Tuberculosis can be produced in animals by feeding them milk from tubercular cows, and while it has not been proved that the bacillus in human and bovine tuberculosis is identical, all authorities agree that tubercular milk is a dangerous food, and liable to produce the disease in man.

There is not the same danger of milk from animals affected with anthrax or foot and mouth disease being used, as these diseases cause radical changes in the appearance of the milk, as well as in the appearance of the animal.

It has long been recognized that milk is an active agent in the dissemination of typhoid fever; this may occur through

the adulteration of milk with water to which the typhoid bacillus has gained access; through the using of similarly infected water for the washing of cans; or through the handling of utensils or milk by typhoid carriers, persons having the power of infecting others though showing no clinical symptoms of the disease. Milk may also cause intestinal trouble in children through the introduction of filth containing putrefactive bacteria at the time of milking; and in most cases where disease is spread by milk it is through uncleanliness of producer or seller.

Bacteriology has provided a way of escape from these dangers in pasteurization which if properly carried out, will destroy pathogenic bacteria which do not form spores, such as the tubercle and typhoid bacilli; but pasteurization will not render milk clean, neither is it compulsory, and the greater part of the milk used is in the raw state, so that it is only by thorough inspection of dairies, milk depots and their water supplies that the public can be safeguarded.

Next to milk, butter must also be looked upon as a vehicle through which infectious material may be distributed in a way that leads directly to the human stomach, and in a way that the individual has no means to protect himself. Tubercle bicilli have been found to exist in butter, and in greater concentration than in milk. It has also been proved by investigators that the bacilli were alive and virulent after 120 days (Dawson). The U. S. A. Bureau of Animal Industry inoculated guinea pigs with butter, made from infected milk, the butter being 99 days old, with the result that the animals developed generalized tuberculosis.

Canned goods are another part of our diet that requires inspection. All kinds of meat, fish, fruit and vegetables are preserved in cans, and these also may become unwholesome and dangerous to the consumer, unless the quality used is good and the canning properly done. The quality of the article can only be guaranteed by inspection at the factory, but a regular inspection of places where these goods are sold is requisite, for if the cans are defective, or the sterilization imperfect, putrefaction of the contents may not start until after the goods have left the factory and are on the grocer's shelves, and then they begin to show the typical bulging ends. Cans may rust from various causes and the rust may eat a small hole in the can, sufficient to let in the air and the bacteria ever present in it, with the consequent spoiling of the goods. These damaged goods are sold cheaply and are a constant source of trouble to the food inspector.

With regard to fruit and vegetables, while they are affected by a number of diseases, they are not dangerous to man, although rotten fruit has been the cause of diarrhoea in children. There is one danger in conection with lettuce, cress, celery, and such vegetables as are eaten raw, and that is they may be contaminated with the eggs of T. Echinococcus, a parasite common in dogs and capable of developing in the human subject. Cases of typhoid fever have been traced to the eating of cress, grown or washed in water containing typhoid bacilli, so that attention to cleanliness is as great an essential in handling or selling vegetables or fruit as in the case of foodstuffs.

In the case of other articles of food, the danger lies in the fact that they may be adulterated with substances more or less harmful to man. These adulterations may be for various purposes, such articles as benzoate of soda, boric and salicylic acid are used as preservatives, as they have the power of delaying fermentation and decay. All these chemicals have been proved injurious to health, and apart from that, their use enables unscrupulous manufacturers to use goods which may be unfit for use. Some adulterations are in the form of coloring matter, which may contain compounds of arsenic and copper, and although the amount used is small there is a certain amount of danger in their use. In other cases substances may be used which are neither harmful nor beneficial, but are put in merely to make weight or bulk. To avoid danger to health from these sources, samples of goods must be taken from time to time and submitted to chemical analysis.

Many laws have been enforced in past years relating to this subject. As long ago as 1203 A.D. in the reign of King John there was a proclamation enforcing legal obligations with regard to bread, and in

the following reign a statute was passed for the express purpose of protecting the public from dishonest bakers, brewers and butchers. This statute is worthy of notice as it is the first in which adulteration of food is specially noted and prohibited. The penalty provided was unique, for the first offence the dishonest dealer was drawn on a hurdle from the Guildhall to his own house, through the streets where most people assembled, with the faulty loaf or other article hanging round his neck. For the second offence he was put in the pillory, and for a third offence his bakery was pulled down and he was put out of business. It is a fortunate thing for some people that such a penalty is not enforced at the present time.

In the reign of George I., in 1725, laws were passed regarding the adulteration of tea and coffee, these laws being enforced by the excise officers.

No matter how good and fresh articles of food may be, they will not remain in that condition long if they are kept in unsanitary places, or exposed to contamination by dust and flies; and a regular inspection of places where food is kept for sale or prepared in any way is absolutely necessary, for in some cases the violation of sanitary laws may be through ignorance on the part of the proprietor; in other cases, through carelessness, and in still a few other cases through pure "cussedness" and an open defiance of the laws of hygiene.

At the present day most of our foods are put up in packages, which not only eliminates the danger from dust and flies, but also from promiscuous handling by possible disease-carriers.

The demand for package goods, wrapped bread, and bottled milk is a sign of awakening interest on the part of the public in a matter in which it is vitally interested—the preservation of public health.

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RETROSPECTIVE AND PROSPECTIVE

By DR. W. H. HATTIE, Provincial Health Officer, Halifax.

A GLANCE over our statistical records for the last provincial year, and a comparison of last year's experiences with those of previous years, enable us to draw some conclusions as to the progress we are making. The Deputy Registrar-General computes the general death rate for 1915 as 15.3. For the previous year it was 15.1, and for the quinquennial period 1909-1915 it averaged 14.9. This is rather disquieting to a recently appointed Provincial Health Officer who has ambitions, and it can certainly not be regarded as satisfying. However, it is possible to extract some sunbeams from the cucumber.

The tuberculosis death rate, which has been so distressingly high in Nova Scotia, was lower in 1915 than in any other year for which we have statistics. The deaths from pulmonary tuberculosis numbered 124 less than in 1914; while the death rate from this disease, which averaged 1.79 during the quinquennium 1909-1913, and which was 1.56 in 1914, dropped last year to 1.30 per 1,000. In 1911 the rate was 1.97, so that last year's rate is 34 per cent. less than the rate of five years ago. It is quite wrong to deduce conclusions from such a comparison, but when one is searching for sunbeams the finding is not to be despised.

Another bright ray is to be found in the statistics for infectious diseases. The deaths recorded as resulting from these diseases numbered 92 less last year than in the previous year. And there were 25 fewer deaths attributed to infantile diarrhoea in 1915 than in 1914.

Thus in the case of the communicable diseases — those to which the M. H. O. especially directs his attention—the statistics for the year show improvement. Even though it is unwise to bank too much upon the experience of a single year, one may be at least permitted to feel encouraged by such results, and to derive a stimulus to greater effort for the future.

A practical point, and a sharp one, so strongly thrust into us by last year's statistics that we should be kept awake for a long time, is that reduction of the general death rate is not to be attained merely by efforts at the control of communicable diseases. Despite a notable lessening in the number of deaths from the communicable diseases, last year's total death rate was really in excess of that of the year before. It would prove a wearisome and possibly not a very fruitful task to go into an analysis of the causes which contributed to this regrettable state of affairs. It will suffice to say that the duties assigned to the health officer by our Public Health Act cover a very small portion of the field to which he might well direct his energies, and that an ideal organization of our public health service would provide the means by which no factor which bears in any way upon the maintenance of health should be neglected. There can be no doubt but that many of the conditions which loom large in our mortality returns are more or less amenable to control, and that the scope of the public health official might with great advantage be widely extended, if our people could but be made to appreciate the fact and to authorize the necessary expenditure.

*Association of Medical Health Officers of Nova Scotia, July 4th, 1916.

Careful attention to cleanliness and ventilation, to general measures of sanitation, to the quarantine of infectious diseases and subsequent disinfection of the premises in which they have been housed, are all measures the importance of which should not be minimized. But we should be careful not to make a fetich of such things. We have learned that those who live in squalid, dirty, overcrowded and ill-ventilated homes do not continually suffer from infectious diseases; that in point of fact very sturdy and healthy people often live under most unhygienic conditions. It is therefore not dirt, or lack of ventilation, or sewer gas, or squalor alone which determine the incidence of disease. Whether such factors have the influence in reducing resisting power and in disposing to infection, which we have been in the habit of attributing to them is, just now a moot problem. The only assertion which we can make with assurance is that the determining factor in infection is an infecting micro-organism. In the absence of the specific cause, an infectious disease will not develop. And as our knowledge of specific causes becomes more perfect, our conception of the way by which infection is commonly communicated is being modified. Thus we find that many notable authorities no longer regard fomities as a common vehicle of convection, and have ceased to incriminate third persons as frequent spreaders of infection. The opinion is rapidly gaining ground that the communicable diseases are in practically every instance disseminated direct from infected persons to susceptible persons who come into more or less intimate contact with them. Such knowledge not only simplifies our public health methods, but it makes them more exact, and has in many places led to a notable modification of the rules relating to quarantine and disinfection.

Attention is being directed more and more to the foci from which infection spreads rather than to the route by which it may be disseminated. The present teaching is that the control of communicable diseases can best and most reasonably be effected by taking charge of and destroying the infective organisms at the moment they leave the patient. They should not be given an opportunity to reach other individuals in such a state of virulence that they may cause disease in such individuals.

The problem remains a large one, but it is less imposing than might at first thought appear. It is becoming daily more evident that infective micro-organisms can find a suitable nidus for growth and multiplication only in the human body, and that, with few exceptions, they rapidly lose virulence when they leave the body. The passage of infection from one person to another is, therefore, seldom possible unless the transfer be made with reasonable directness. Germs escape from the patient's body especially in the discharges from mouth, nostrils, bladder and bowels, and in the mouth spray which is ejected in the acts of sneezing, coughing, loud speaking, etc. Germs gain access to the bodies of others mainly through the mouth. Prophylaxis, consequently, is to be accomplished by rendering it impossible for such transference to take place.

Our faith must therefore be pinned more particularly to the person charged with the responsibility for caring for the infective patient. If we could be sure of competent and careful nursing, we need have little fear of the spread of infection from known cases. The problem which we have to solve is to secure the provision of such nursing and to devise a means of ferreting out the sources of infection (missed cases and carriers) which escape detection by our present methods. If we could but succeed in this, we would be at once in a position which would justify us in very materially modifying our methods of quarantine and disinfection, thus greatly lessening the expense and inconvenience attendant upon the care of infective patients, and which should enable us theoretically, to quickly eliminate all infectious disease.

It is especially important that all infective matter be efficiently disposed of immediately upon its issuance from the body. Few pathogenic organisms retain virulence for any protracted period outside of the body, so our efforts should be concentrated upon them during the time in which they are capable of causing mischief. Discharges from mouth, nose, bowel and bladder should be disinfected at once, and the vessels into which such discharges

have been received should be promptly rendered non-infective. Any body- or bed-clothing, and any article of any kind which may have become contaminated by an infective discharge should have immediate attention. Of outstanding moment is the need for prompt cleansing of the hands of the nurse or attendant who renders such a service. Let it never be forgotten that infection is nearly always received through the mouth, and that the attendant who neglects to wash hands after touching anything upon which infectious matter has recently been deposited, may contaminate a dish or other article which may subsequently come into direct contact with the mouth of another individual. One has but to think for a moment of the numberless uses to which one's hands are put, and of the numberless occasions on which they pass unwashed to the lips, in order to appreciate how important a part they may play in the distribution of infection.

Discharges from mouth and nostrils should be received, on issuance, upon pieces of gauze or old linen, and either burned at once or enclosed in paper bags or other suitable receptacles until an opportunity for burning arrives. The mouth and nose of the patient should be covered by gauze or old linen during the acts of sneezing, coughing or speaking, in order to prevent the ejection of mouth spray which may contain the infective element. And the hand which has held such gauze or linen should be cleansed at once. It is only by most minute attention to such all-important detail that the distribution of infective organisms can be prevented. This is a matter which cannot be emphasized too strongly.

Such measures are entirely practicable when we know that we have an infective case to deal with. But what are we to do about the cases which we have no knowledge of? Epidemiological studies have demonstrated the possibility of discovering such cases with much less difficulty than one might suppose. The epidemiologist must first endeavor to mark out zones of infection. This at once limits very materially the field to be investigated, and by a study of the zones it is usually possible to quickly determine what cases have been missed, and ordinary methods can then be adopted to ascertain whether or no there are any disseminators amongst these missed cases. The successful epidemiologist must, of course, have very special training added to natural acuteness and energy, and his value in public health work can hardly be over-rated. A special feature of his province is the detection of carriers of such infections as enteric fever and diphtheria—a difficult but not necessarily an impossible task, and one very essential to the successful prosecution of public health work. It is obvious, therefore, that a trained epidemiologist should be included in the personnel of a well organized public health service.

Without such an official, it cannot be expected that we will ever acquire full knowledge of every focus from which infection may spread. Even when physicians realize the obligation which rests upon them to report every case of infectious disease, we will still have to contend with the mild and probably unrecognized cases which receive no medical ministrations other than those of the grandmother or maiden aunt, to whom the public health act is a totally unknown quantity, and for whom the penalty clause has therefore no greater terror than it has for the average medical practitioner. When success in the conquest of infection depends upon accurate knowledge of every focus of infection, it can be seen how hopelessly inadequate are the measures now commonly in vogue. Fortunately it may, with a certain degree of reason, be assumed that the milder cases of infectious disease—those which are most likely to escape the observation of the physician—are not so likely to be the sources of spread of a severe type of disease as those cases to which the doctor is summoned. But it would be manifestly unwise to place too much dependence on such an assumption. Even if it were an infallible rule, while it might ease our minds in the matter of fatality, the neglect of such cases would not lessen the prevalence of communicable disease with its attendant suffering, expense and interference with business and industry. If we are not to continue our losing gamble with infection and death, we must take this thing seriously and make

adequate provision for the prompt discovery of every case of an infectious nature and of every carrier of infection, as well as for efficient nursing and supervision.

In some respects we are especially favored in Nova Scotia. Such problems as water supply and sewage disposal, which are so difficult of solution in many communities, cause us but little concern. Practically every town in the province is able to secure its supply of water from a source which insures purity, while the sewage, in practically every instance, is discharged into tide waters and thus satisfactorily disposed of. We are therefore in the very fortunate position of being able to concentrate our efforts upon other phases of public health work, and our responsibility for the proper performance of our duty along the lines which do demand our attention is relatively greater than if we had also to contend with the difficulties and expenditures which so commonly associate with the supply of water and the disposal of sewage.

We must, of course, neglect no part of the work which falls within the scope of the health officer, but it would appear only reasonable that we should direct our energies more especially to those conditions which exact of us the greatest toll in life and suffering and economic loss. A comparison of our statistics with those of other communities shows that we are in an unenviable position in respect to infant mortality and tuberculosis. Why should our infant mortality be double that of New Zealand? Why should our tuberculosis death rate be double that of Ontario and five times that of Saskatchewan? Why should we raise such a hue and cry over smallpox, which no one need have unless he so elects, and remain silent under the scourge of tuberculosis, which menaces every man, woman and child in Nova Scotia to-day? Do we not still pay tithes of mint and cummin, and neglect the weightier matters of the law?

We must endeavor to acquire a proper sense of proportion, and energize upon the most important things first. By all means the most important condition with which we have to contend is tuberculosis.

Other communities have effected tremendous reductions in the death rate from tuberculosis. We must do likewise. Our provincial legislators have made possible the establishment of a chain of institutions for the care of those tubercular patients who are mainly responsible for the distribution of tubercular infection. It is left to municipal legislators to decide whether or no such institutions will be provided. Very liberal assistance from the provincial treasury is assured by statutory enactment, but the initiative lies with the municipal authorities. It is our duty to use our every influence in the endeavor to induce the municipal and town councils to take speedy action upon this most important matter. And of course we must not remit in our efforts to educate the people in the methods to be adopted to prevent the spread of this disease.

Child welfare also demands our most careful consideration. Re-population becomes a necessary corollary to the war. Never before has the life of a little child meant so much to the nation. Our future work must give the means of effecting a substantial reduction of the infant death rate a foremost place. Health and opportunity must be assured our little ones if our province is to maintain a position of influence in the affairs of the Empire and of the world. At a recent conference of the Royal Sanitary Institute, called to discuss sanitary administration under war conditions, it was urged that no matter what retrenchment might be permissible in other lines, their should be no curtailment of effort in the promotion of child welfare and tuberculosis control.

We attach much value to educational literature in health matters. It is an encouraging sign of our times that such literature is largely sought after. The prominence given by newspapers and periodicals to "health talks" and articles which bear more or less directly on the maintenance of health, is an indication that there is a general demand for this type of literature. But unfortunately this reading matter is only appreciated by those who have reached adult life, who may have already been crippled and incapacitated through ignorance of the matters concerning which they are now greedy for knowledge. One cannot but feel that a vast good could be accomplished by suitable instruction of our school children in

the simple laws of health. I would have such instruction imparted in the lower grades, as it is only in these grades that all children can be reached. A speaker at the last Conference of Charities and Correction made this striking observation: "One cannot overlook the fact that the drunkard, the tramp, and the criminal were for many years under the instruction of our teachers in the public schools." We would enlarge this group by the inclusion of the physically unfit, and we may well ask ourselves if we have done wisely in neglecting to enlist in sympathy and co-operation of the school teachers in the great work of preventing disease.

The apathy of people generally is the most discouraging of all the difficulties with which we have to contend. When public interest is aroused, it is too often concerned in matters which have an aesthetic rather than an actual sanitary bearing, and the M. H. O. is often called upon to deal with what is really merely a nuisance and may not constitute any menace to health. It is only by education that such apathy can be overcome or such mistaken zeal properly directed, and in such education we have all a part to take. Our people should be made to realize the value of health, not merely because of the added pleasure which it gives to life, but because of the loss in efficiency and in earning power which sickness entails. The war has taught us a great lesson in respect to the cost of sickness, and it affords us an opportunity of doing really patriotic work by putting forth our best efforts to conserve the lives and health of our people, so that they may be able to render the most effective service to the Empire in this most critical of all times.

A FEDERAL BUREAU OF PUBLIC HEALTH

By DR. J. B. BLACK, ex-M.P., Windsor, N.S.

(Association of Medical Health Officers of Nova Scotia, July 4th, 1916.)

THE first and most important consideration of any nation is the health of its people. No nation can prosper, no nation can compete with or surpass its neighbors whose people are not vigorous, virile and healthy.

In a young nation like Canada with great areas, great resources to develop, the question of population of a virile people is of paramount importance; and wise statesmen have resorted to the policy of bringing in (and at great cost), people from other nations. Wiser statesmen would in addition to this, have adopted a policy of saving to the state our own people, who are dying of preventable diseases.

In the British North America Act, which welded together the British provinces on this continent, there was not forgotten Public Health; but knowledge of requirements were at that date, very limited and one small paragraph covers it all. The first section relating to public health defines the power of the Federal Government. The Federal Government has charge of "Quarantine and the Establishment and Maintenance of Marine Hospitals." The Act assigns to the Provinces "the establishment, maintenance and management of hospitals, asylums, charities and eleemosynary institutions in and for the Province, other than marine hospitals." Even with this superficial reference to the requirements necessary to care for Public Health, the Federal Government recognized its duty and its sphere, and did assume the responsibility of conducting this Department, and its duties were assigned to the then Minister of Agriculture. Until 1872 the administration of public health was conducted by a Federal Bureau, and under it a Federal Medical Board of which the late Doctor Tache (Deputy Minister of Agriculture) was secretary. The reasons for its lapsing were financial entirely. Here let me quote from a Federal official of public health: "For some years all public health work in Canada was administered by the Federal Government under the powers given it by the British North America Act." The Federal Government, with an uneasy conscience in evading their duty in the past, have been trying to make amends by taking a part of the health department to the Conservation Commission, with a medical adviser.

The Canadian Medical Association has been keenly alive to the need and great importance of a Federal Bureau of Public Health, and has on many occasions drawn the attention of the Government to this subject. In 1902, at the annual meeting at Montreal, Dr. E. P. Lachapelle, of that city, seconded by Dr. J. R. Jones, of Winnipeg, moved the following resolution: That, in the opinion of the Canadian Medical Association now in session, the time is opportune for the Dominion Government to earnestly consider the creation of a separate Department for Public Health under one of the existing ministers, so that regulations, suggestions and correspondence on such health matters as fall within the jurisdiction of the Federal Government, may be issued with the authority of a Department of Public Health." In 1903, a similar resolution was passed and a deputation from the association waited on the Prime Minister, urging the formation of a Bureau of Public Health. At that time, the Prime Minister authorized Dr. Roddick, M.P. (now Sir Thomas Roddick) to place a resolution on the Parliamentary Order Paper, with the view of having the subject thoroughly discussed, before the Privy Council took the matter up in earnest. In 1904, another deputation waited on the Government in this matter; and again in 1907 another deputation, appointed by the Canadian Medical Association, waited on the Premier. All these were cordially received and I am strongly of the opinion that if we had had, at that time, a Minister of Agriculture as sympathetic on this matter as was the Premier and some other members of the Cabinet, we would have had now a Federal Bureau of Public Health and a national laboratory for re-

search and the production of antitoxins and serums.

Is not a man worth more than an ox? The several Federal Governments since 1874 evidently think not.

For the protection of the health of domestic animals, the Federal Government has for years, had a national laboratory under the control of a Veterinary Director-General. From this laboratory there is sent out every year biological preparations, sometimes free, sometimes at merely nominal prices, for the prevention of disease amongst and treatment of domestic animals. More than a hundred veterinary surgeons are employed in this department, and more than half a million dollars are spent annually, for the prevention of disease in and treatment of animals. If it is the duty of the Federal Government to protect the health of hogs and cattle, how infinitely more is it their duty to protect the lives of our people?

Here is a little story told by Dr. Hurty, which is so short and so much to the point that I venture to repeat it: "A little mother under 25 years of age, was told by her physician, that she had the beginnings of consumption. She was told that it was curable. She wrote to the Federal Government — —the Government so solicitous for hogs and oxen—saying: 'I am told I have consumption in its earlier stages and can be cured by outdoor life, continued rest and proper food. I do not want to die, I want to live. I think I am of value to the nation. I want to raise my children, to make them good citizens. Where can I get well?' The reply was to this effect: 'This great Christian country has not yet risen to the mighty economy of saving the lives of its people or its little mothers from consumption or any other disease. So far as we are concerned, the only place you can go to, is the grave'. That is the first part of the story, this is the second part: A big fat hog one morning found that he had a pain in his stomach. He squealed loudly and the farmer came out to see what was the matter. The hired man said: 'He's got the hog cholera.' The farmer telegraphed to the Veterinary Department of the Government and the reply came quick: 'Why, certainly, I'll send you a man right away.' And sure enough he came—a D.V.S., a Doctor of Veterinary Surgery. He had a Federal Government syringe and a bottle of Government medicine, produced by the Government laboratory. He went for the hog and the hog got well. Now here is the moral: 'In Canada be a hog and be worth saving.' "

Apart from quarantine stations, marine hospitals and one lazaretto for care of leprosy, the Federal Government does practically nothing to prevent disease or preserve the lives of our people.

It is needless to say before this body of intelligent and educated medical men that disease and death (except from accident and senectus) can be prevented. It is also needless to say, that a Federal Bureau of Public Health properly equipped and scientifically organized, could to this end do more than any other institution. The Federal Bureau could do what the Provincial Boards cannot do for want of means, for want of money, equip a national laboratory which is so much needed, and provide for diffusion among the people by press and platform of knowledge of the laws of health, advice, caution, guidance. Here come the words of Holy Writ: "My people die for lack of knowledge." The appalling loss of life, the appalling loss to the nation of citizens and money, wealth, is worth considering. The basic cause of preventible diseases is want of knowledge, ignorance, ignorance which a Federal Bureau could largely dispel, saving thousands of lives and thousands of dollars beyond the cost of its labors.

The fiat has gone forth that all men must die, and it is for our greatest good, but it is unnecessary that our people should die in infancy, in youth or in middle age from preventable diseases. We are losing over 82,000 of our people every year. The estimate of scientific man is that one-third of that number die of preventable diseases, die while yet wage earners, die while yet adding to the wealth of Canada. At this estimate we are losing over 27,000 every year whom we should not lose. Looking at this from a monetary standpoint only, and placing the value of a man's life to the state at $1,000 (as it has been estimated over and over again), we are losing yearly to Canada, over $27,000,000 in the money value of lives sacrificed for the want of knowledge, from dis-

eases preventable, diseases which have no reason to be on the earth.

The heaviest tax paid in Canada to-day is for funerals, for burials, for the unnecessary sacrifice of human lives. Of all the unnecessary and inhuman conditions in Canada to-day, the worst is the slaughter of little children. We are losing every year over 32,000 children under 5 years of age, and most of them are done to death by ignorance in feeding. And the Federal Government has never lifted a finger to prevent this, but has spent many thousands of dollars to bring in foreigners to fill up this awful gap. Letting our own die without an effort to save and bringing in the foreigner, may be good statesmanship, but I doubt it.

A plea was made by the Minister of Agriculture in the late Government, that a Federal Bureau of Public Health would interfere with the rights and privileges of the Provincial Governments. This plea is untenable. It is ultra vires of the British North America Act, and it is directly at variance with the action of the Federal Government after Confederation, when "For years all public health work in Canada was administered by the Federal Government under the powers given them by the British North America Act."

There are many things relating to public health which can be done and done only by federal authority, and others which could be done more thoroughly than by provincial authority. Among the former are the very important questions of pollution of international rivers and streams—the St. Lawrence, the St. John, the St. Croix, the St. Francis, the St. Clair and several others — not Saints — which mark parts of the boundary between this nation and our sister nation of the United States. These offer grave dangers to the lives of our people, whose drinking water is taken from these rivers—dangers that can only be dealt with by Federal authority. In the same position is international transportation, by which disease is carried from one country to another. The question of pure food is already administered by the Federal Government, though why it adopts this responsibility and ignores others of national scope, I know not.

Another matter of pressing necessity and of paramount importance, is a Dominion laboratory, which can only be properly equipped and managed by the Federal Government.

(Here was read Conservation Commissioner's report to Premier.)

A Federal Bureau for Public Health would in no way interfere with or compromise the good work of the Provincial Boards. On the contrary, it would assist, encourage and stimulate the local boards to greater and more enlightened efforts. The medical men, the clergymen, the laymen, the every-day people of this Dominion must never cease the agitation for a Federal Bureau for Public Health.

The Government is expending vast sums in different federal departments to protect the health and save the lives of hogs, cattle and sheep; to protect our forests against waste; to protect our orchards from insect pests; to conserve our resources — all of which relate to the development and prosperity of our nation, while the health and lives of men, women and little children — these the greatest source of wealth, progress and prosperity —are denied that assistance, that guidance and enlightenment so necessary for their welfare, their happiness and useful citizenship. But the late Minister of Agriculture says: "Public health measures belong only within the jurisdiction of the provinces." With as much sense and reason might the province say it belongs to the county and the county say, it belongs to the municipality and the individual, and the devil take the hindmost. It is the work of **all** these, and no one of them should shirk it, especially the Dominion. The men of Canada who are ready and willing to fight in defence of liberty, or give up their lives for Canada and the Empire, have the right to the Government's protection of their wives and children from disease and death, which that Government can and should prevent.

In the name of economy for the wasted millions of money, in the name of humanity for the needless loss of lives, for the suffering, sick and dying; in the name of the needy poor, who have lost their bread-winner, let us never cease our agitation until a Federal Bureau thoroughly equipped with laboratories, bacteriologists, sanitary engineers, and a far-reaching press department is established at Ottawa.

SOME REFERENCES TO THE PRACTICE OF MEDICINE, THEN AND NOW

By DR. GEORGE E. DE WITT, M.H. O., Wolfville, N.S.

(Association of Medical Health Officers of Nova Scotia, July 4th, 1916.)

THOSE of us who have been engaged in the active practice of medicine for nearly or quite half a century sometimes realize with startling significance the change wrought in the practice of medicine and surgery then and now. Fifty years ago the aim of the practitioner of medicine was largely individualistic. The doctor concentrated his energies on the individual, he sought to arrest the course of the disease and check its ravages in the patient rather than seek the cause and prevent its recurrence and spread in the community. The treatment of the patient by the old routine without seeking the cause or seeking the manner in which these causes operate to produce their effects, is as unscientific as to undertake to cleanse an obstructed sewer without removing the obstruction.

The practice of medicine within the past thirty-five years has not tarried here. Linked with a knowledge, or the recognition, of a certain group of symptoms, giving it a name, and having a knowledge of a dry or local application or other resource that will put an end to these symptoms this is a more rational, complete and scientific view. It reaches out after the communal seeks after and discovers the cause, adopts measures to remove the cause and prevents the recurrence or outbreak of the disease; in the case of infectious disease preventing its spread in the community. This is preventive medicine, which slumbered and slept up to about thirty-three years ago. Since then, this brooder and more scientific view has slowly but surely been shedding across the horizon its shafts of light and truth, giving a clearer vision and confidence to the followers of the noble art of healing, and a greater guarantee of safety to the community.

Those of us whose work in the profession goes back from forty to fifty years, as we have endeavored to keep in touch with the conquests of medicine and surgery during that time and compare them with the present, marvel at the strides that have been made.

We remember the doctor in the old days visiting his typhoid patient day after day, administering calomel and opium, opium and calomel, strewing chloride of lime around the room (depending upon the strength of its odor to allay anxiety caused by the danger of infection), but ignoring the cause. Though the sink drain ran into the well and the barn with a filthy dairy herd was in close proximity to the house, the milk in pans in the house unscreened from flies; though the excretions from the patient were thrown into the privy vault (not burned or buried), though the windows and doors of the house were unscreened and the flies had access to all sorts of food, yet the doctor heeded not these things. His efforts were directed toward the morbid conditions of his patient, individualizing his energies, because he did not know how and why the infection was carried from door to door.

How changed are the conditions to-day! Not only does the physician individualize his efforts and skill in treating his typhoid patient, but the next thought is to protect the rest of the household and the community, by rendering all excreta harmless, burying or burning the same, and excluding flies. Not only has the discovery of the typhoid bacillus given an impetus to the enforcement of sanitary measures, made imperative the necessity of a pure milk and water supply, and done much to lessen the virulence and spread of typhoid and reduce its death rate, but added to these valuable measures for the suppression of the disease we have at hand antityphoid innoculations, which have become imperative in the army—the result of the practice proving a success. Frank W. Schofield, the Bacteriologist of the Provin-

cial Board of Health of Ontario, in a paper read by him before the Health Officers Association of that province and published in the Canadian Medical Journal, gives an interesting account of its prophylactic efficiency. He reports that during the last three years about 8,000 doses of antityphoid vaccine had been distributed by the Ontario Board of Health in the Province of Ontario, and the Board had not received any unfavorable reports. The Bacteriologist says, never give the vaccine to a patient who is fatigued. Allow no physical work after the injections. The more strictly one rests, the less discomfort caused by the reaction. Avoid alcohol either immediately before or after the injections. My experience with typhoid during the past year has been confined solely to an hotel, where all of the members of the family contracted the disease, save one, and also a housemaid and two permanent boarders. My conviction was and is that the disease was disseminated by a typhoid carrier living in the hotel. The cook had had the disease seven years before, and a permanent boarder two years previous. The blood of the cook was subjected to the Widel test with a negative result; that of the permanent boarder was not tested.

Within the last thirty-five years we have the discovery of the bacillus tuberculosis by Koch, in 1882, which brought home the fact to the profession that tuberculosis is infectious and in order to cure it, or stay its progress, a resistance must be built up in the system by fresh air, diet, graduated exercise, etc., thus hastening the process noted by Metchenkoff that the phagocytes or white blood corpuscles attack and destroy bacteria which have found their way into the blood stream. Tuberculin, discovered also by Koch, has made it possible by introducing it into the system to discover the presence of tuberculosis in suspected and early cases.

The practical application of diphtheria antitoxin, discovered in 1894 by Behring and Roux, has ridden the human race of much of the horror that existed in an epidemic prior to its discovery and application. Those of us who passed through the epidemics of diphtheria in the seventies and eighties of the last century, comparing the treatment and mortality of the disease then and now, can appreciate the blessing bestowed upon the world by these scientists. We are now assured that when diphtheria antitoxin is injected early into the blood of the diphtheria patient, it joins forces with other antitoxic substances in the body and thus counteracts and cures the disease. Also it is true, that antitoxin injected into those who are exposed to the infection will render them immune. So effective has this mode of treatment become, that the death rate from diphtheria has been reduced two-thirds.

In diphtheria as in other infective diseases, as cholera and typhoid, there lies the hidden danger of carriers who harbor the germs of the disease without showing any signs of sickness and are unsuspected until an outbreak occurs. Here again the bacteriologist comes to our aid and analyses the blood or the excretions of the suspected one.

That plague of the tropics, yellow fever, where proper sanitary laws have been enforced, has almost become a thing of the past. We are all aware of the ravages and great mortality of yellow fever thirty years ago. In Cuba, the West India Islands, South America, Central America, on the west coast of Africa, and in all countries where proper sanitary measures have been applied, where inherent conditions have not prevented, this scourge has been almost entirely abolished. All of us are familiar with the efforts of the French in the middle of the last century, when building the Panama Canal. Eleven-sixteenths of their workmen died of this disease; of twenty-four Sisters of Charity twenty died; of seventeen engineers sixteen died of yellow fever. Later, when the Americans undertook the construction of the canal, they called to their aid the resources of preventive medicine, which had been made use of in Cuba by General Gorgas in ridding Havana of the disease. Marshes were drained, herbage cut, pools and puddles were drained or covered by a film of parafin oil, and houses were screened, with the result that the mosquito, the direct agent of transmitting the cause of the disease was destroyed. A similar tale may be told of other countries infested with yellow fever.

Blood poisoning, gangrene and erysipelas prevailed in the hospitals years ago —now they are of the past. When I commenced the practice of medicine purpereal fever did its deadly work. The cause and means of prevention were not known or used. In a neighboring town a practitioner lost seven cases in as many weeks. It was before the days of practical antisepsis in rural communities. He did not know that he carried the disease from bedside to bedside.

At the age of sixteen years (fifty-seven years ago) I had a severe attack of scarlet fever. I remember how thirsty I was. My tongue was parched, my skin hot, burning and irritable. The old practitioner who attended me would not allow any but warm drinks. One night, while suffering intolerable thirst, heat and burning skin, with no sleep and no rest, I bribed the kitchen maid to take a two-quart pitcher into the cellar and fill it with cool cider. Oh! the relief! I just revelled in that cider until I got relief from thirst, and then I slept. When the doctor came in the morning, "Oh!" he said on greeting me, "you are better." "Yes," I said, "I feel better." From thence, irrespective of the doctor's orders, my medicine which I kept stowed away behind the bed, consisted of sips of cool cider. I recovered.

Since 1880 the progress of pharmaceutical chemistry has led to the discovery of many valuable drugs; not the least of these, 606, discovered by Ehrlich, which, if worthy of the virtue accorded it, will prove to be the greatest boon that has ever been found to lessen and subdue the greatest scourge that affects the human race. The drug is an instance of an entirely new therapeutic introduced by Professor Ehrlich, and based upon the principle that a specific chemical affinity exists between specific living cells and specific chemical substances. The series of such drugs that may be formed may prove to be almost unlimited, as we gather from the fact that salvarsan, viz., 606, represents its numerical order in the trial made to attain the desired result. If the credit given to this drug proves true, the young men who enter the field of medicine to-day, go armed with a weapon which will help them to do their share more effectively than their predecessors ever could in ridding the race of the physical and mental defects which visit the children of syphilitics from generation to generation, thus hastening the day which the practice of eugenics is endeavoring to produce, viz., a race of the mentally and physically fit.

Not only does the young man in medicine go forth to-day equipped with drugs which are the product of the modern laboratory, but his armamentarium is strengthened by the new means and methods devised in facilitating diagnosis.

New methods of apparatus for taking the blood pressure, for examining the vocal apparatus and larynx by direct vision, apparatus for lighting up the cavity of the stomach, and not least the X-rays, discovered by Roentzen in 1893, have opened up a new field in the recognition of disease in concealed parts of the body. The character and extent of injuries, of dislocations, the presence of foreign bodies swallowed or otherwise, the disease of some of the internal organs, are all made plain to us.

Word comes to us from the great battlefields of the facility with which the character of wounds is determined and foreign bodies discovered by the aid of the X-ray. Major Wilson, of the Canadian General Hospital, speaks of the wonderful facility with which the work is done. He says the Canadian General Hospital has been provided with 15-h.p. petrol electric generators and the largest types of X-ray machines, enabling them to handle a large number of cases in the shortest space of time. Every general hospital has a number of X-ray apparatuses, and in addition there are two extra mobile units sent from place to place. A wounded man can be brought into the hospital, a photo taken, and the patient sent back into the hospital again in three minutes. The marvelous work of the X-ray, the trained nurse, the number of qualified medical men in each unit, the aseptic treatment of wounds, are life-savers which in the memory of some of us in past wars as the Crimean in the fifties, the Civil War of the United States in the early sixties, and even in the Boer War, were not possessed.

What a change from the **then** of thirty-five years ago to the **now** of 1916! What marvelous achievements have been wrought in medicine and surgery. All of which must give courage and confidence to the younger generation in the pursuit of the conversation of human life.

The diabolical gases of the Germans first made appearance at Ypres on the eighth day of May last as a cloud of green vapor, borne by the air toward that noble battalion of 1,126 picked men, the Princess Pat's Own, who from their crescent-shaped trench had by cannon and Enfield mowed the Germans down. Behind this strangling mass of vapor the Germans came with bayonets fixed. The gallant Canadians made ready to meet them, but this cloud of fumes, at that time to them a mysterious foe conceived in hell, materialized and and sent forth by devils incarnate, enveloped these gallant boys, the flower of Canadian manhood. It burned its way into their lungs until they could not breathe, and the 1,126 noble souls who had stood proudly in review at Salisbury Plain before the King and that efficient and noble soldier, the late Lord Kitchener, with a determination to do or die for their country and king, were soon a writhing, struggling mass, of whom scarcely sixteen men of the sixteen platoons were uninjured. But thanks to the laboratory and to a Canadian, Col. Naismith, who has found a palliative or preventive in the hyposulphate of soda used in a respirator, even this latest device of malignant Hun strategy is not much feared now.

Within the last thirty-five years there has not only been a wonderful decrease in the death rate from infectious diseases in our country, as smallpox, diphtheria and typhoid, but, simultaneously, all over the civilized world, such diseases as the bubonic plague, typhus fever, diphtheria, cholera and beri beri have been remarkably decreased in prevalence and potality as compared with former years.

Much has been done in Nova Scotia within the two past decades to improve and make more effective the Public Health Act, which doubtless has lessened and checked the march of infectious diseases. Yet we are of the opinion that a more perfect and practical system of surveillance is necessary in promoting sanitation in the rural districts than has yet obtained. I refer more particularly to the appointment of medical health officers for each county, singling out here and there a busy practitioner to do the duties of health offices at a remuneration of $100 per year. While this system obtains there will not be the progress which would result if qualified men whose hands were not tied by the routine of a large medical practice were secured for districts allotted to them at a remuneration commensurate with the duties devolving upon the office. Such a regulation would strengthen the hands and heart of the Provincial Health Officer and facilitate the progress of hygiene and sanitation in the province.

I must not weary your patience longer. Let me say to the young men entering the practice of medicine now, you have a goodly heritage. Your lives have fallen in pleasant places. Forget not that the men in the past toiled and strove to heal without many of the privileges you now enjoy and possess.

Remembering the words of the poet,—

> "We are living, we are dwelling,
> In a grand and awful time,
> In an age on ages telling,
> To be living is sublime."

And forget not another, who said and is still saying,—

> "To cure is the voice of the past;
> To prevent the divine wisdom of to-day."

DISINFECTION

By DR. JOHN K. McLEOD, City Medical Officer, Sydney, N.S.

(Association of Medical Health Officers of Nova Scotia, July 4th, 1916.)

THE following are two definitions from a standard dictionary, one of "fumigation" and the other of "disinfection."

"Fumigation" is the act of fumigating or disinfecting.

"Disinfection" is a process of disinfecting.

I suppose, however, we all agree that disinfection means purification from infectious matter.

There is probably no subject in preventive medicine that has received more attention or discussion than disinfection, and perhaps none on which the profession is more divided. Those who saw disinfection and fumigation as practised in the long ago, bring forward apparently indisputable evidence that they are right, while others who advocate at least a change from former methods have equally strong proof that it is time for a change. Disinfection was practised long before the cause of disease was understood, and of course was carried on in a very haphazard way. It is within the memory of many here when the small bag of camphor was hung about the neck as a sure preventive of smallpox and other infectious diseases, and this was done by the most intelligent. Bowls of carbolic acid, the fumes of which permeated the atmosphere, were found in sick rooms as well as in the rooms of the healthy, to prevent disease. These simple things were done by the laity. The physicians were more strenuous in their methods. When smallpox, diphtheria or scarlatina occurred, houses were placarded, all inmates confined, constables placed at the doors and the whole premises closely quarantined for a long period. After the patient was cured or dead, the bedding and indeed everything that came in contact was burned, even the house in some instances went up in flames. This, of course, was in days when drastic measures were used. Then followed a period when we did away with constables and we trusted to the honor of the people, but we still destroyed clothing, etc., with fire. The results were just as good as when constables were employed. Gradually we got into the way, instead of burning the clothing, of depending almost entirely on fumigating with sulphur and soaking clothes in carbolic or bichloride, and the results were just as successful as when more drastic means were used. Now after isolating the case we not only do not destroy clothing, furniture, etc., but some of us are wicked enough to allow the children out in the yard to play, the bread-winner goes to his work under certain restrictions, and we shorten the period of quarantine very considerably, and the results are just as good as before. In Nova Scotia we have not yet got further away than that, for our laws compel us to follow certain regulations, but in New York, Providence and other places terminal disinfection is a thing of the past and the results are at least as satisfactory.

While it is quite true that the theory that clothes do not carry infection is not generally accepted, it is a safe statement that it is becoming more generally accepted, and scientific evidence as well as practical observation lends support to this theory. It is a fact beyond dispute that disinfection as practised generally is done very imperfectly. It is doubtful if any officer present, giving a candid and frank statement, will deny that in his district houses have been fumigated and disinfected by the family, of course under his instructions. Indeed perhaps only one room is disinfected, and in some instances houses have not been fumigated at all, and yet it has been found exceedingly difficult, if not impossible, to trace any infection to these houses. In New York the officers of health for the past number of years go in and out of infected houses without protective gowns, and in no instance has a case of infection been traced

to them, either in their own houses or outside. It is contended, and I think more or less conclusively, that clothing, etc., seldom if ever carries infection. If this contention is correct how then is disease spread? What is the medium of infection and how best can we prevent and control it?

(1) By contact.

(2) By infection through flies, lice, mosquitos, etc.

It is now generally conceded that diphtheria is spread through contact with the person having the disease, and occasionally through contact with diphtheria carriers. The same probably applies to scarlet fever and certainly to measles, especially before the rash appears.

Yellow fever, which formerly was believed to be caused by infection from the clothing and individuals, is now known to be caused by a bite of a mosquito.

Typhus fever, a short time ago dreaded as one of the most infectious diseases, is now known to be due to the bite of the body louse.

Plague, the most dreaded of all diseases in years gone by, is now known to be caused by the bite of a flea.

As our knowledge increases and as investigations go on we will discover that infection spreads in this way rather than through clothing, and that disease spreads by "persons not things, and the public should know it," and guard themselves accordingly.

Is infection carried by the air? The more the contact theory develops the less belief there is in aerial infection. It is conceded that aerial infection may occur by means of droplets due to speaking or coughing upon anything near at hand.

In a very excellent paper written by Dr. Whitelaw, of Edmonton, and published some time ago in the Public Health Journal, he gives the following information: "That Rosenau in his work on Preventive Medicine and Hygiene states that communicable diseases are not conveyed from man to man or even from bed to bed in well managed hospitals. In the Kingston Avenue Hospital, in Brooklyn, various diseases, as smallpox, measles, scarlet fever and diphtheria are treated in wards only a few feet apart with no evidence of aerial transference. At North Brothers' Island similar methods are followed with equally good results. At the Pasteur Institute, Paris, patients are each cared for in a separate ward opening into a common hall. In two and a half years there were treated 2,000 persons, of whom 524 had smallpox, 443 diphtheria, 126 measles, 163 erysipelas, 92 scarlet fever, and 166 non-diphtheritic sore throat. During this time the only evidence of transfer of infection was the development of four cases of smallpox and two of measles. In the Children's Hospital, Paris, where the beds are separated by partitions only, there were but seven cross infections, six of measles and one of diphtheria among 5,017 cases, and these were attributed to lapses of aseptic precautions. In England similar methods have been tried with success in various hospitals. Dr. Chapin, of Providence, in his work on Modes and Methods of Infection, has gathered a mass of evidence which supports contact infection as the chief factor in the spread of disease."

If contact then is the cause of disease what should be done to prevent the spread of disease:

1. Early report, and isolation of the patient and of those who have come in contact until the danger period is over.

2. Aseptic precaution by those in attendance on patients.

3. Cleaning every day the room occupied by the patients and destroying mouthwipes, etc., used daily.

4. Until it is scientifically proved that infection is not caused in any other way, soaking clothing in bichloride and washing floors and walls with same.

5. Thorough housecleaning when disease is over.

CEREBROSPINAL FEVER, FROM THE STANDPOINT OF EPIDEMIOLOGY

By ALBERT G. NICHOLLS. M.A., M.D., D.Sc., Captain A. M. C., Director of Public Health Laboratory, Halifax.

(Association of Medical Health Officers of Nova Scotia, July 4th, 1916.)

EPIDEMIC cerebrospinal meningitis, better termed cerebrospinal fever, has come into an unwelcome notoriety in this country within the last two years. Previous to this we heard but little about it, though it has been more or less prevalent in various parts of Canada for eighteen years, though never to the extent that one could term epidemic. It is impossible to get accurate information in regard to the extent of its incidence owing to the loose way of reporting vital statistics in vogue until comparatively recently, and the unfamiliarity of the general practitioner with a rather occasional disease. In Montreal, the earliest undoubted case that I know of, confirmed by autopsy, occurred in 1898. Since that date the affection has cropped up at intervals. In the four years, 1910-1913, one hundred and six deaths were reported in that city as definitely attributed to the disease. In Nova Scotia it prevailed in epidemic form about twelve years ago, but does not seem to have reappeared until the fall of 1914. Between October of last year and the present time there have been 68 cases reported to our Provincial Health Officer, distributed according to counties as follows:

Cape Breton, 11; Antigonish, 5; Guysboro, 3; Pictou, 9; Cumberland, 2; Colchester, 10; King's, 3; Annapolis, 2; Digby, 1; Queen's, 4; Lunenburg, 1; Halifax, 15; Hants, 2.

From personal knowledge of conditions existing in Halifax during this period, I am satisfied that the figures returned for that county are far too low. Including military and naval cases, sixty would be nearly correct, making a total of 113 for the whole province. A study of the returns reveals the fact, noted also in other countries, that the disease is much more prevalent in cities and towns than in rural districts. Thus of our 113 cases, 104 were urban and only 9 rural.

It is somewhat difficult to come to any precise conclusions as to the prevalence of cerebrospinal fever in the civilized world. The germ of the disease was discovered by Weichselbaum of Vienna in 1887, but his results were not generally accepted for some years. The character of his organism and its specific pathogenicity were for long not adequately understood. Only within the last two years can we say that it has been studied with any completeness, and much still remains to be elucidated. Part of the trouble lies in the fact, that, like the diphtheria bacillus, the Weichselbaum meningococcus may be present in the human body without causing its specific lesions, and, contrariwise, these lesions may be closely simulated as a result of infection with other organisms. Thus, the meningococcus has been found associated with conditions that are not meningeal, such as nasopharyngeal catarrh, tonsillitis, influenza (so-called), and arthritis. It is present in the nasopharynx of a certain proportion of healthy individuals. A large amount of experience and experimental work was necessary before it became possible to appraise the exact role of the meningococcus as a disease-producer. Further, it is certain that sporadic cases of cerebrospinal fever have escaped recognition in many instances, or, not have been inadequately studied from a bacteriological standpoint. We may add that the question has been obscured also by failure to adopt a uniform and accurate nomenclature in statistical returns, and that it is only within very recent years that the disease has been notifiable. Moreover, the difficulties in diagnosis are in some cases by no means inconsiderable, particularly as they present themselves to the physician who has only seen the occasional sporadic affection. There can be no doubt, however, that the disease has been widely distributed, that it is practically endemic in all countries, particularly in cities, and that epidemics break out only at compara-

tively rare intervals, as a result of the operation of special conditions. The correctness of this statement will hardly be disptued, when we realize that it has been proved that meningococcus infection is not infrequently present in a community "in disguise." Some of the "colds" in the head, bronchitides, catarrhal sore throats, and "influenzas" are beyond question of this nature. The work of Still and others, too, has shown that the so-called "posterior basic meningitis" of infants and young persons is due to the Weichselbaum meningococcus.

The facts that the meningococcus is an organism of low vitality, as is proved by the difficulty in obtaining cultures from material containing the germs even in abundance, is speedily killed out by slight deviations in either direction of the optimum temperature, and is very susceptible to drying, would appear to negative the view that the specific infection can be carried by dust, insects, food, or clothing. That epidemics occur in communities only at wide intervals under the conditions, postulates the intervention of the "carrier."

There are three classes of "carriers": First, those who have recovered from cerebrospinal fever, but still harbor the specific microorganism in their noses and throats; second, those who have been in contact with cases of the disease and have acquired the germ; third, those who appear to be in good health, who presumably have not been in contact with known cases, and yet harbor the germ, the so-called "normal" carriers.

It is impossible to form an accurate estimate of the numbers of all or any of these classes of individuals, for it is only within the last few years that observations have been made in these directions, nor until now have bacteriological methods been sufficiently perfected to give us trustworthy results. Still, with what information we possess, we may come somewhat near the truth.

In regard to the question how long the meningococcus may persist after convalescence, the observations of Dr. W. M. Scott (Reports to the Local Government Board, New Series 110, 1916) go to show that in 50 per cent. of cases complete convalescence has occurred before the nasopharynx is free. The maximum period of potential infectivity is not settled but is more than three months.

So far as I can gather, about 27 per cent. of "contacts" become "carriers," though it is a singular fact that only a very small proportion of these develop meningitis themselves. They may, however, pass it on. It is the general consensus of opinion among hospital and institutional physicians that epidemic cerebrospinal meningitis, even when not isolated but treated in a general ward, rarely spreads to the nurses, doctors, or other patients.

The number of "normal" carriers ordinarily at large in a given community is hard to determine. Kutscher swabbed 56 persons suffering from slight catarrhal affections of the upper respiratory passages and obtained cultures of an organism indistinguishable from the meningococcus "morphologically, culturally, and in the immunity reactions" in four. These, perhaps, should not be regarded as normal persons. Hubener and Kutscher, following up this work, examined the throats of 400 soldiers in a regiment which was free from cerebrospinal fever, and found meningococci in eight. This regiment several months previously had been quartered with a regiment in which cerebrospinal fever had occurred. The figures of Mayer, Waldmann, Furst, and Gruber (1910) are the most extensive with which I am acquainted. Examining the throats of 1911 soldiers in garrison, at a time when cases of cerebrospinal fever were occurring, they discovered that 2.46 per cent. were carriers. Examining 9,111 men in garrison in Munich, who were healthy presumably, and at a time when meningitis of this type was not prevailing, they found 1.73 per cent. to be carriers. Dr. Eastwood (Reports to Local Government Board, 1916) in 480 instances taken from the outpatients attending the aural department of St. Bartholomew's Hospital, found 10.2 per cent. to give positive results. These were not contacts. Moreover, it was not found that a conspicuously large portion of these positive cases presented pharyngitis. Being hospital patients, these, again, perhaps cannot

strictly speaking be called "normal" carriers. Dr. W. M. Scott examined the throats of 138 persons at the outpatient department of the Lambeth Infirmary. Twenty-six were normal individuals; the rest suffered from chronic coughs, rheumatism, "bad legs," etc. None, so far as was known, had ben incontact with meningitis cases. 13.7 per cent. were positive. So far as can be judged from our imperfect information, taking all classes of the community ill and well alike, it would seem probable that about 2 per cent. of healthy individuals harbor the meningococcus under ordinary conditions.

Before, however, epidemics of meningitis can break out something more is necessary than the mere existence of "carriers." The "carriers" must infect either themselves or others. Considering the very small number of cases of disease in proportion to "carriers," and the only occasional appearance of epidemics, as well as for other reasons already cited, it is evident that the meningococcus is an organism of low vitality. Evidently, then, the susceptibility of infected individuals must have been increased, or, otherwise, their resistance lessened. Here we have a somewhat close analogy with the case of the pneumococcus. Sternberg found that 80 per cent. of persons, taken at random, harbored the pneumococcus in their throats. Notwithstanding this enormous number of carriers pneumonia is relatively infrequent. The deaths from pneumonia in this province average 500 yearly. The death rate in this disease being about 20 per cent., we may infer that there are 2,500 cases annually. Taking the population of the province to be 500,000, of whom 400,000 are pneumococcus carriers, the proportion of cases to carriers is, therefore, 1 to 160. In the cases of epidemic cerebrospinal meningitis, 2 per cent. of "carriers" amongst our population means 10,000 potential disseminators of infection. Seventy-five cases of cerebrospinal fever in one year means a proportion of cases to "carriers" of 1 to 133. Probably, the parallel between the two diseases is not fairly established, inasmuch as in the case of meningitis we are dealing with a very few cases developing during much too short a time. In other respects, at any rate, pneumonia and cerebrospinal fever present close analogies. They exhibit the same seasonal variations, being both more prevalent during the winter months and at the turn of the seasons; they are diseases of the young and vigorous; while usually endemic, they both may occasion epidemics, though such are generally of small proportions. However, it must be said of cerebrospinal fever, that while fewer people are likely to contract it, the mortality is much higher (30 per cent. under the most favorable conditions; 80 per cent. under the most unfavorable). This, doubtless, is to be explained in view of the more vulnerable and important structures involved in this disease.

So far as our knowledge goes, the factors which govern susceptibility in cerebrospinal fever are, age, season, climate, and social environment. No age is immune, but the disease is overwhelmingly more prevalent in children and young adults. One of my cases, however, occurred in a man over sixty.

With regard to season, most cases occur between October and June. Statistics from other countries agree, I think, that April is the worst month in this respect. So soon as the warm weather of summer comes, and the thermometer ceases its vagaries, the disease dies out.

The influence of climate is hard to estimate. On general principles one would think that a cold, wet, windy, and especially a changeable, climate, as inducing catarrhal troubles of the respiratory passages, which predispose to the more serious infection, would be of importance. Some authorities doubt this, however, as a low temperature is inimical ot the development of the meningococcus. If the former view be correct, we are confronted with the apparent paradox that the same influence which promotes infection tends to cure it. In my experience, catarrhal troubles of the respiratory tract, at least in an obtrusive degree, are not common as precursors of cerebrospinal fever. I take it, however, that these somewhat speculative considerations are rather futile after all. The truth may very well be that an individual carries about the meningococcus for a time in his nasopharynx; exposure to wind and weather gives him

a "cold"; the meningococcus makes a speedy entry into his dilated nasal capillaries and lymphatics; and infection becomes an established fact. The state of the weather matters little after this.

Social environment appears to count for more. Experience has shown that most cases of cerebrospinal fever develop among those who, possibly previously in the best of health, have been crowded together under conditions of food and housing to which they have been unaccustomed. We find the disease very commonly, therefore, among soldiers and sailors, young recruits by preference. These men often live in badly-ventilated barrack-rooms, with dusty floors foul with expectoration, and, besides, are exposed to unaccustomed weather conditions and exercise beyond their strength. Granting such conditions, there must, even yet, be very close association with the carrier before these persons become infected. It is those who sleep in barracks on either side of the carrier, and those who mess with him that run the greatest risk. The measures found most efficacious for checking epidemics of cerebrospinal fever, as they occur among troops, consist in minimizing the dust nuisance in barracks, suppressing spitting, establishing free ventilation, and keeping the men out of their sleeping quarters until they are to retire. General hygienic measures are of the utmost importance, in a word. When the disease has broken out a systematic search for "carriers" should be made, and such segregated until cultures from their throats prove negative on two successive occasions. The most rigid measures of isolation of the patients, and disinfection of their clothing and bedding, should be instituted.

The precautions to be adopted in the case of the sporadic outbreaks of the disease, as they occur in the household, are of more importance to us at this time. In general, we should institute the same routine measures to prevent the spread of the infection as we would take in a case of typhoid fever. The patient should be strictly isolated; the urine, faeces, discharges from the eyes, nose, and mouth, should be disinfected. Dishes and bedding of the patient should be kept separate from the rest, and be disinfected immediately after use. Nurses and doctors should wear large protective aprons on entering the sick room; on leaving, the hands and face should be well washed, and a disinfectant and cleansing spray used on the throat and nose two or three times daily by all who come in intimate contact with the case. The urine and faeces of the patient, as well as of all contacts, should be disinfected until it is certain that the possibility of contagion has passed. Systematic spraying of the noses and throats of the patients should be persisted in for at least three weks after convalescence has been established. A spray of peroxide of hydrogen (1 per cent.) has been recommended for this purpose. Some think a nasal douche is better, as leading to a more thorough cleansing of the parts.

Whatever substance is used, it is important that it should be bland, and dilute enough to be unirritating. These measures may be dropped so soon as repeated cultures from the nasopharynx show this region to be free of meningococci. When it is impracticable to take cultures, and it often is, spraying should be kept up for at least three weeks, and the convalescent should be isolated from the rest of the family to the extent that he has his own room, clothing, and dishes, his belongings being kept strictly away from those of other members of the household. It would be better to serve his meals separately, and have the dishes, clothing, and linen washed by themselves. The total length of time during which these latter tactics are to be pursued should be an additional three weeks.

The Great Consulting Room ofn
Wise Man is a Library—Dawsoa

MILK AND ITS HYGIENIC RELATIONS—By Janet E. Lane-Claypon, M.D., D.Sc. Lond.—Published under direction of the Medical Research Commitee—With eight plates and diagrams in the text.

This work, though convenient in form and volume, is encyclopædic in scope. Here is indexed, classified and presented all that is known about milk. The accumulated results of innumerable experiments and unwearied investigations as to composition, properties, functions and effects of milk, not only in its normal condition, but also in its many modifications—Pasteurized, centrifuged, sedimented, heated, cooled, malted, peptonized, and predigested, are at home here to all comers.

The gifted author shows by example what happens when a capable woman takes the professional ribbons in hand and drives a scientific investigation and records its results.

No one who wishes to be thoroughly informed in the literature and statistics of this subject can afford to ignore such an argosy of research. The scope of the work may be imagined when it is stated that one chapter alone—chapter vi.—has note taken of ninety-nine bibliographical references.

Here is the last word on bacteria and their power to resist the attack of heat and other germicides. Here is stated the comparative merits of shorthorns, Jerseys, Holsteins, etc. Nothing about milk near or remote seems to have been omitted. Thirty-six columns of matter is indexed, and several full-page plates and appendices add to the convenience and effectiveness of this remarkable storehouse of knowledge about milk.

Longmans, Green & Co. have put their best work into the exterior and have presented the colossal labors of the author and editor in a form concise and inviting.

THE INTESTINAL PUTREFACTIONS—Clinical Studies on Enterocolitis—By Charles Fenner Peckham, M.D.—Snow and Farnham Co., Printers—1916—Price $2.00 nett.

This, a careful study of entero-colitis, a subject too lazily known even by the medical profession, for the second stage is little understood and the third often mistaken for simple or pernicious anæmia or acute inflammation, etc.

The volume includes a thorough study of micro-organisms found in the intestines, the details for the examination of feces, and a resume of the various forms of intestinal putrefactions. A chapter on Malaria, syphilis and tuberculosis as intercurrent affections, and one on anaphylaxis as a concomitant of entero-cliotis, add to the value of the work, which is completed by an exhaustive presentation of the best treatment for the various types of the affection.

In the general considerations with which the volume closes our author is inclined to believe that under-eating is more pernicious than over-eating, that constipation is not incompatible with long life, that the amount of canned goods varies inversely as the thrift of the family using them. "It is shameful," he says, "to find tin cans labelled Pork and Beans on the premises of any self-respecting farmer."

A simple life, less worry, a less hectic pursuit of pleasure, plainer and better food, evenly balanced diet, fewer condiments, avoidance of habitual catharsis, and more fresh air and sunshine are the desiderata urged by our author for the prevention of this disease so wasteful and destructive of human lives.

CANADIAN POETS

XXX

LAURA E. McCULLY

Miss McCully's poetry is enriched by classical illustrations, and expressed in forceful and melodious language. Her imagination relates us to the universe and to humanity. Wordsworth found new lessons in the fields and woods, and taught them; Lanier made trees, flowers and clouds our intimate friends; when we read Miss McCully's nature poems we are not conscious of the moralizing of the poet, we are in the glens ourselves listening to bird-songs or pine psalms, or on the hill-top looking at the afterglow, with the purity, the glory, the growth spirit, and the transforming beauty of nature flowing into our lives. In a few flaming lines her stories reveal the love, the despair and the ultimately triumphant faith of humanity. With tender pathos she unveils the evils of social and industrial conditions, and in clear tones arouses each soul, and makes it conscious of the splendour of the better conditions ahead, and thrills it with the determination to achieve for justice, freedom and truth.

—James L. Hughes, LL.D.

IN a very real sense Miss Laura Elizabeth McCully, M.A., is a Toronto writer, as, with the exception of one academic year, in the United States, and a few months in Ottawa, she has lived all her life in this city.

She is a grand niece of the late Hon. John McCully, of Truro, Nova Scotia, one of the Fathers of Confederation; and is the daughter of Samuel Edward McCully, M.D., and Helen (Fitzgibbon) McCully. Her father is of Manx descent, and her mother is a descendant of the late James McBride, of Halton county, Ontario, magistrate, who was one of the pioneers of this province, and who heroically cleared off

forest and left to his heirs, one thousand acres of valuable farm lands.

Miss McCully was educated at Deer Park Public School, Jarvis Collegiate, and University College. Throughout her University course she stood high in the class lists, and graduated in 1909 with first-class honours in English, History, French and German. She was and is particularly attracted to the ancient Anglo-Saxon language, and her written theses on this branch of study, together with the recommendation of her teacher, Professor David Keyes, M.A., procured for her a Fellowship in Yale College. In this Institution she studied for an academic year (1909-10) under the well-known author of text-books in Anglo-Saxon, Dr. Albert S. Cooke.

Miss McCully is proficient in athletics; and is an ardent advocate of the rights of women, political, professional and industrial. She has firm belief that this century will fully establish equality of sex and of racial responsibility.

Her first book of verse, *Mary Magdalene and Other Poems*, was published by the Macmillan Company of Canada, Limited, in 1914. It contains fifty poems of such quality that one feels, after several readings, that this young poet must yet climb far up the heights of poetic achievement.

CANOE SONG AT TWILIGHT

Down in the west the shadows rest,
Little grey wave, sing low, sing low!
With a rhythmic sweep o'er the gloomy deep
Into the dusk of the night we go,
And the paddles dip and lift and slip,
And the drops fall back with a pattering drip;
The wigwams deep of the spirits of sleep
Are pitched in the gloom on the headland steep.
Wake not their silence as you go,
Little grey wave, sing low, sing low!

From your porch on high where the clouds go by,
Little white moon, look down, look down!
'Neath night's shut lid the stars are hid,
And the last late bird to his nest has flown.
The slow waves glide and sink and slide
And rise in ripples along the side;
The loons call low in the marsh below,
Night weaves about us her magic slow,—
E'er the last faint gleam in our wake be gone,
Little white moon, look down, look down!

OUR LITTLE SISTER

Weep, little shrinking spirits of the woods,
Hang down your fair, green faces, all ye leaves,
And dews be heavy on the year's first-born,—
Yea, weep as rain, all ye that breathe of spring,
To-day I passed her in the city streets!

Surely the kind brown earth must pity her,
Nursing its young so safely at the breast,
All the great winds that no man may defile
Compassionate her, and the bending trees
Happy in fruitfulness and blest with song!

But where her feet are set of all God made
No stone remains; and wearing childhood's face
Fixed in an awful lethargy and calm,
Defiled, defiling, yet accusing not,
Avenged upon her race, she passes on.

THE TROUBADOUR'S LYRE

Sing low, my precious lyre, low in each string,
Thou wast not framed for exaltation's burst,
Or chant sustained, straining thy golden chords,
Sing low, sing low, thou constant friend, my lyre!

For now we two may wander forth in peace,

Shattered our shackles are and stricken
from us,
And we shall rise and steal out into the
world,
Singing all day, on every way, my lyre.
Like Orpheus have we two sojourned
through hell,
And with our eyes seen evil, nor availed
To wrest their treasure from the envious
shades.
Therefore come forth, leave to the Gods
their world!

If we should find that orchard lamped with
gold
Of heart's desire, fasting will we pass on,
Nor rifle one small, new-blown wayside
flower,
But bless its beauty, pass, and passing, sing.

Thus shall we travel light of foot and free,
And call the world our garden and the
woods
Our house, and hear the great winds call
to us,
And sometimes feel the dripping of the
dews
In lonely places. Come, for we are free.
O lyre, heart of my heart, formed for the
wind
That is God's breath, and not for human
hands
Jangling amid the strings, come, let us go!

A BALLAD OF THE LAKES

My love she went a-sailing
Ere yet the day was done,
And a wind blew up, and a wind blew up,
Straight out of the setting sun.

I sat on a rock a-fishing.
Where flashes the bronze-black fin
And the eddies swirl and suck and curl
When the river tide comes in.

She hailed me from the headland
And I saw the brown sail swing
Till the rope ran tight and it lifted light
As the sweep of a wild duck's wing.

'O where go ye a-sailing,
For the day will soon be done,
And see the shroud of shifting cloud
That's following up the sun?

'It's off I am to the eastward,
To the rim of the world away,
Ply sail and oar for the far-off shore
And none shall bid me stay.'

So she sailed away to the eastward
To the far horizon's rim,
Where rosy kissed through a veil of mist
The line of the shore lay dim.

And the sun sank down the marshes,
In a field of flame he rolled,
The heaving track from the boat slipped
back
Like a path of molten gold.

Each little wave seemed smiling,
Lips curled in a rosy bow,
Like a babe asleep on the breast of the deep
That rocked it to and fro.

And I sat on my rock a-fishing
While further down the west
The sun sank slow to his bed below
In the marshes' swaying breast.

Sudden a white owl hooted
From his nest in the pine hard by,
And a whip-poor-will sent an answer shrill
From the depths of the flaming sky.

I looked away to the westward
And there I saw it stand,
A cloud pure white and small and bright
As the palm of an opened hand.

One leap to the jutting headland,—
Like a blow it stung my face,
The cap of wind with the threat behind
Of the squall that comes apace.

Out on the lake there widened
A wreathing ring of black,
And the spreading cloud like an out-flung
shroud
Promised the coming wrack.

The waves rose white and frothing,
With a hiss like a rattle-snake
That glides at night past the lantern's light
On the path through a slimy brake.

Have you seen the inland waters
When the black squall rides the wave?
For it comes like light and there is no flight.
And you call on God to save,

As I, one breath, 'Save, save her!'
And I plunged in the driving roar,
For my light canoe pierced through and through
Lay high on the rocky shore.

Clean stroke, long breath, poised body,
They laugh at your manhood's pride,
The billows that seethe and drive in your teeth
When the breath cramps in your side.

A quarter-mile to the headland?
Ten miles of boiling hell!
Blind, choked and stung, bruised, tossed and flung
In a world that heaved and fell.

But once, from the crest of a comber
The gleam of a distant sail,
As slight a thing as a butterfly's wing
Tossed into the teeth of the gale.

On, on, is your blood turned water?
Shall a straining muscle's pain
Though it snap like tow speak louder now
Than the cry of heart and brain?

In my ears the roar of thunder,
In my eyes a spray blood-red,
But once I sank, lost wind and drank,
And something snapped in my head.

Do you know the way of the waters
When their sudden wrath is o'er?
Rubbish and wrack they cast safe back,
And they cast me on the shore.

Do you know the way of the waters,
The hungry, restless wave?
They take for toll a living soul
And no man knows the grave.

Then search no more by the marshes
Where the moon stands up so white,
Has never a bird through the silence stirred
All the long, bright summer night.

Then seek no more by the river
Where the water lilies gleam,
So pale and still, so ghostly chill
Like a dead face in a dream,
For the eyes may ache with seeking,
They may search till they see no more,
And the heart grow old and the pulse beat cold
Ere my love comes back to shore.

MARY MAGDALENE SOLILOQUIZES ON LOVE

Sing, heart of spring, along the winter ways,
Go lightly feet, 'twas here His footsteps fell,
The birds sing of Him for he counted them
And knew them all, the little winged loves
Like happy thoughts! Yea, every leaf that kissed
Him passing in the garden hath such life
As puts our immortality to shame.
The winds are pregnant with His message now,
The Universal, all-uniting winds
That know no limitation, like the spirit
Of mighty truths, sweeping creation's bounds,
Disdaining man-made barriers, change and time.
Yea, since He came, sing resurrected soul,
As nature sings, through winter unto spring!
For now the ancient curse is past away,
The simple way and straight made plain to man
And love exalted, love revealed, proclaimed
Not love that self has sought for selfish ends,
Nor love possessing or possessed, but love
Creating, sacrificing, binding all,
Conceiving good but as the good of all,

Laying down life that life may be fulfilled
In the new life that springs a thousandfold
More rich for sacrifice. O perfect bliss
Which man alone of all creation failed
To grasp, to comprehend! See how the earth
Meekly and sweetly, with a sure content,
Lays down the old year's leaves, yields to the wind
Her precious, garnered seeds, nor makes complaint,
But in her heart, all lowly, sings of spring;
See her emerge from tempest, recreate,
Instinct with life, noble and large and calm,
At peace with the infinite purposes of God!

Sing, heart of spring, along the wintry way
His blessed feet made glad. Weep not for Him,
Nor for the world, nor for thy human pain.
Could'st thou have died as He did, who could rend
That place from thee? Most perfect was His part,
But thou hast thine, to succour, heal and teach,
Even as He, perchance to die as He
For man. Sing, happy heart, along life's way
For joy and love are met in thee and life
Wells new within thee, sing for spring is here,
Sing, for thine eyes have seen the Risen Lord!

RESOLVED THAT MODERN SANITARY MEASURES ARE CONDUCIVE TO THE IMPROVEMENT OF THE HUMAN RACE

Paper Read in a Debate by Thomas Watson, Member Royal Sanitary Institute, Provincial Sanitary Inspector, Saskatchewan.

IT WILL BE impossible in the time at our disposal to enumerate and notice all the sanitary measures that have conduced to, or are contributing to the improvement of the race, but some of the chief means, will, we contend, be sufficiently convincing in support of the resolution.

The scope of our subject you must observe is comprehensive; it embraces the human family. Sanitary measures are enacted and employed not for the individual, but for the benefit of the whole people collectively. Further, in order to keep strictly to the text of the resolution, let us define "sanitary measures," and then bear in mind that we must show clearly that improvement, whether physically, mentally, morally or spiritually has been the result of those measures.

Sanitary measures are those pertaining to, tending or designed to promote health. Sanitation is the science of sanitary conditions, and of preserving health, and is synonymous with hygiene, or as the late Professor Parkes puts it, is "the science which aims at rendering growth more perfect, decay less rapid, life more vigorous, and death more remote."

Sanitary measures, then, are all the means employed for the public good, which has brought about that improvement to mankind, which we claim has resulted by their employment.

We must confine ourselves to modern measures, but where can we draw the line as to what is ancient? Suppose we restrict ourselves to the period when the first P. H. A. in Britain was passed, viz., 1838, as roughly speaking a century, our opponent cannot then claim we are borrowing from the ancients.

During the period within which we propose keeping, it is wonderful what investigations have been made into the causes of disease, and how remote the causes have something been found. Some of us can remember the time when the courts, alleyways, and even the streets in the old lands were unpaved, a condition which prevented them from being properly cleaned, indeed it was common for them not only to be littered with all manner of animal and vegetable organic material, but to have reeking accumulations of animal manure. In the courts and lanes were cesspits or pools of putrifying liquid matters which soaked into the soil, causing a never-ending nausea from the septic action, and continually giving off gases, which being inhaled, lowered the vitality of those unfortunate enough to live in the vicinity.

In the overcrowded districts of cities it was observed that disease in its worst forms, but chiefly of an infectious nature, was ever present. After the passing of the P. H. A. which authorized local authorities to take many hitherto undreamt-of sanitary measures, a gradual awakening to conditions existing among the working classes took place. Among the first measures to receive attention was paving. The Corporation of Liverpool, a city which has always been in the van in matters pertaining to health and education, began to pave its streets, and to insist that courts common to large numbers of tenants be paved, so that the city scavengers could cleanse in some degree the filth which accumulated. It did not take long for medical men and others to notice improvement in the health of the residents.

This measure of paving led to many discoveries, the chief perhaps being, that it was found many of the ground floors of dwellings were at a lower level than that of the courts. The results of paving and the resultant drying of the soil surrounding dwellings were as immediate and apparent that the case rate of diseases in one district, in which were 57 houses, fell from an average of 85 to 16, and there

Careful attention to cleanliness and ventilation, to general measures of sanitation, to the quarantine of infectious diseases and subsequent disinfection of the premises in which they have been housed, are all measures the importance of which should not be minimized. But we should be careful not to make a fetich of such things. We have learned that those who live in squalid, dirty, overcrowded and ill-ventilated homes do not continually suffer from infectious diseases; that in point of fact very sturdy and healthy people often live under most unhygienic conditions. It is therefore not dirt, or lack of ventilation, or sewer gas, or squalor alone which determine the incidence of disease. Whether such factors have the influence in reducing resisting power and in disposing to infection, which we have been in the habit of attributing to them is, just now a moot problem. The only assertion which we can make with assurance is that the determining factor in infection is an infecting micro-organism. In the absence of the specific cause, an infectious disease will not develop. And as our knowledge of specific causes becomes more perfect, our conception of the way by which infection is commonly communicated is being modified. Thus we find that many notable authorities no longer regard fomities as a common vehicle of convection, and have ceased to incriminate third persons as frequent spreaders of infection. The opinion is rapidly gaining ground that the communicable diseases are in practically every instance disseminated direct from infected persons to susceptible persons who come into more or less intimate contact with them. Such knowledge not only simplifies our public health methods, but it makes them more exact, and has in many places led to a notable modification of the rules relating to quarantine and disinfection.

Attention is being directed more and more to the foci from which infection spreads rather than to the route by which it may be disseminated. The present teaching is that the control of communicable diseases can best and most reasonably be effected by taking charge of and destroying the infective organisms at the moment they leave the patient. They should not be given an opportunity to reach other individuals in such a state of virulence that they may cause disease in such individuals.

The problem remains a large one, but it is less imposing than might at first thought appear. It is becoming daily more evident that infective micro-organisms can find a suitable nidus for growth and multiplication only in the human body, and that, with few exceptions, they rapidly lose virulence when they leave the body. The passage of infection from one person to another is, therefore, seldom possible unless the transfer be made with reasonable directness. Germs escape from the patient's body especially in the discharges from mouth, nostrils, bladder and bowels, and in the mouth spray which is ejected in the acts of sneezing, coughing, loud speaking, etc. Germs gain access to the bodies of others mainly through the mouth. Prophylaxis, consequently, is to be accomplished by rendering it impossible for such transference to take place.

Our faith must therefore be pinned more particularly to the person charged with the responsibility for caring for the infective patient. If we could be sure of competent and careful nursing, we need have little fear of the spread of infection from known cases. The problem which we have to solve is to secure the provision of such nursing and to devise a means of ferreting out the sources of infection (missed cases and carriers) which escape detection by our present methods. If we could but succeed in this, we would be at once in a position which would justify us in very materially modifying our methods of quarantine and disinfection, thus greatly lessening the expense and inconvenience attendant upon the care of infective patients, and which should enable us theoretically, to quickly eliminate all infectious disease.

It is especially important that all infective matter be efficiently disposed of immediately upon its issuance from the body. Few pathogenic organisms retain virulence for any protracted period outside of the body, so our efforts should be concentrated upon them during the time in which they are capable of causing mischief. Discharges from mouth, nose, bowel and bladder should be disinfected at once, and the vessels into which such discharges

have been received should be promptly rendered non-infective. Any body- or bed-clothing, and any article of any kind which may have become contaminated by an infective discharge should have immediate attention. Of outstanding moment is the need for prompt cleansing of the hands of the nurse or attendant who renders such a service. Let it never be forgotten that infection is nearly always received through the mouth, and that the attendant who neglects to wash hands after touching anything upon which infectious matter has recently been deposited, may contaminate a dish or other article which may subsequently come into direct contact with the mouth of another individual. One has but to think for a moment of the numberless uses to which one's hands are put, and of the numberless occasions on which they pass unwashed to the lips, in order to appreciate how important a part they may play in the distribution of infection.

Discharges from mouth and nostrils should be received, on issuance, upon pieces of gauze or old linen, and either [illegible]ed at once or enclosed in paper bags [illegible]her suitable receptacles until an opportunity for burning arrives. The mouth [illegible]nose of the patient should be covered by gauze or old linen during the acts of sneezing, coughing or speaking, in order to prevent the ejection of mouth spray which may contain the infective element. And the hand which has held such gauze or linen should be cleansed at once. It is only by most minute attention to such all-important detail that the distribution of infective organisms can be prevented. This is a matter which cannot be emphasized too strongly.

Such measures are entirely practicable when we know that we have an infective case to deal with. But what are we to do about the cases which we have no knowledge of? Epidemiological studies have demonstrated the possibility of discovering such cases with much less difficulty than one might suppose. The epidemiologist must first endeavor to mark out zones of infection. This at once limits very materially the field to be investigated, and by a study of the zones it is usually possible to quickly determine what cases have been missed, and ordinary methods can then be adopted to ascertain whether or no there are any disseminators amongst these missed cases. The successful epidemiologist must, of course, have very special training added to natural acuteness and energy, and his value in public health work can hardly be over-rated. A special feature of his province is the detection of carriers of such infections as enteric fever and diphtheria—a difficult but not necessarily an impossible task, and one very essential to the successful prosecution of public health work. It is obvious, therefore, that a trained epidemiologist should be included in the personnel of a well organized public health service.

Without such an official, it cannot be expected that we will ever acquire full knowledge of every focus from which infection may spread. Even when physicians realize the obligation which rests upon them to report every case of infectious disease, we will still have to contend with the mild and probably unrecognized cases which receive no medical ministrations other than those of the grandmother or maiden aunt, to whom the public health act is a totally unknown quantity, and for whom the penalty clause has therefore no greater terror than it has for the average medical practitioner. When success in the conquest of infection depends upon accurate knowledge of every focus of infection, it can be seen how hopelessly inadequate are the measures now commonly in vogue. Fortunately it may, with a certain degree of reason, be assumed that the milder cases of infectious disease—those which are most likely to escape the observation of the physician—are not so likely to be the sources of spread of a severe type of disease as those cases to which the doctor is summoned. But it would be manifestly unwise to place too much dependence on such an assumption. Even if it were an infallible rule, while it might ease our minds in the matter of fatality, the neglect of such cases would not lessen the prevalence of communicable disease with its attendant suffering, expense and interference with business and industry. If we are not to continue our losing gamble with infection and death, we must take this thing seriously and make

to combat the disease known as "sleeping sickness" in Equatorial East Africa promises to make the district safe and habitable for settlement; and last but not least in importance the measures which made possible the construction of the Panama Canal, bringing to workmen employed as well as natives of the belt through which it passes an immunity from diseases which previously carried off by death thousands who attempted to work and live there.

There are other sanitary measures operating for the improvement of mankind, which time forbids us mentioning, from some of which perhaps even more convincing arguments might be drawn.

MONTHLY JOTTINGS.

The Annual Meeting of the Association will be held in the City Hall, Winnipeg, on the evening of Thursday, September 14, 1916, at 8 p.m., city time.

At this meeting the reports of the Executive, the Vice-Presidents for the various provinces, and the auditors will be presented and the election of officers will be held.

All members and associates are invited to attend this meeting.

Under Section 13 of the Constitution members not able to attend may entrust their vote by proxy to any other member present. These proxies should be in writing and may be given direct to another member or sent to the Secretary.

The Executive did not feel justified in arranging for anything in the nature of a convention or social gathering, but felt that an annual meeting should be held for business purposes and for the election of officers.

Next year we hope that the war will be over and that there will be a better opportunity for a longer convention.

PUBLIC WELFARE

WHERE LIFE IS SANE

The war will change many things. It has already sobered the world in more senses than one. It has bent the highways of land and sea and draped in mourning the races of all lands.

This is the age of war because it is the age of gold; the age of competitive commerce and net profits, of wealth and poverty, of the master and his "hands." The employer-capitalist with every movement voices his conscious superiority over his employees. His whole bearing breathes self-satisfaction. These are his men; not as efficient, not as brainy, not as self-confident as he, else why are they in his pay? And the men acknowledge it. Their bearing, their whole being voices their subjection to his sway. Both employer and employed are under the government of Gold.

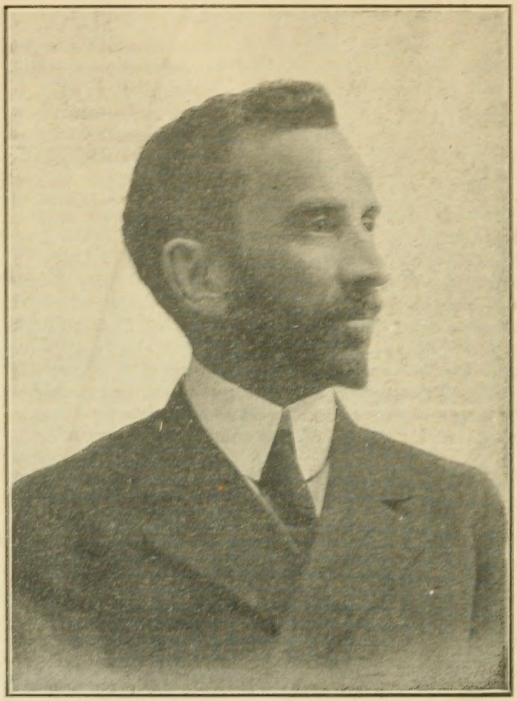
When Gold says the war must go on, on it must go. When Gold says the war must stop, stop it will, and at exactly the gold-appointed hour. It is a commercial war, a gold war. Gold means selfishness. If the war represented the selfishness of all the people the outlook would be gloomy indeed. No, Gold and the Gold war represent net profits, unearned increment: what is over and above that which is paid for by those who are accumulating it. It is the life of the common people put up in negotiable form as net profits, and appropriated by the capitalists by means of the commercial process known as the competitive system.

The commercial process looks well till we examine its products. The employer starts with a little capital and ends with much. The employe begins with much life and ends with little. In other words, the commercial process takes the life of the employees, turns it into gold and hands it over to the capitalist.

And this employer who looks so important and is becoming so rich in the earnings of the poor, the legalized graft of his business—in the net profits, as he loves to miscall it what of him? Well, there is but one test. The life that gives the most of loving service to society in comparison with its material rewards, that is the greatest of lives.

The way out? Ah, that involves popular ownership and control of the land and the capital or means of production. This provides the only sure and imperative safeguard against the exploitation of the masses by the powerful few. It involves love and fellowship. A larger vision of the Christian ideal, faith in one another, and the joy of comradeship in a world "where Love knows Love and life is sane and sovereign."

ALBERT D. WATSON.



DR. J. D. PAGÉ
President Canadian Public Health Association, 1916-1917